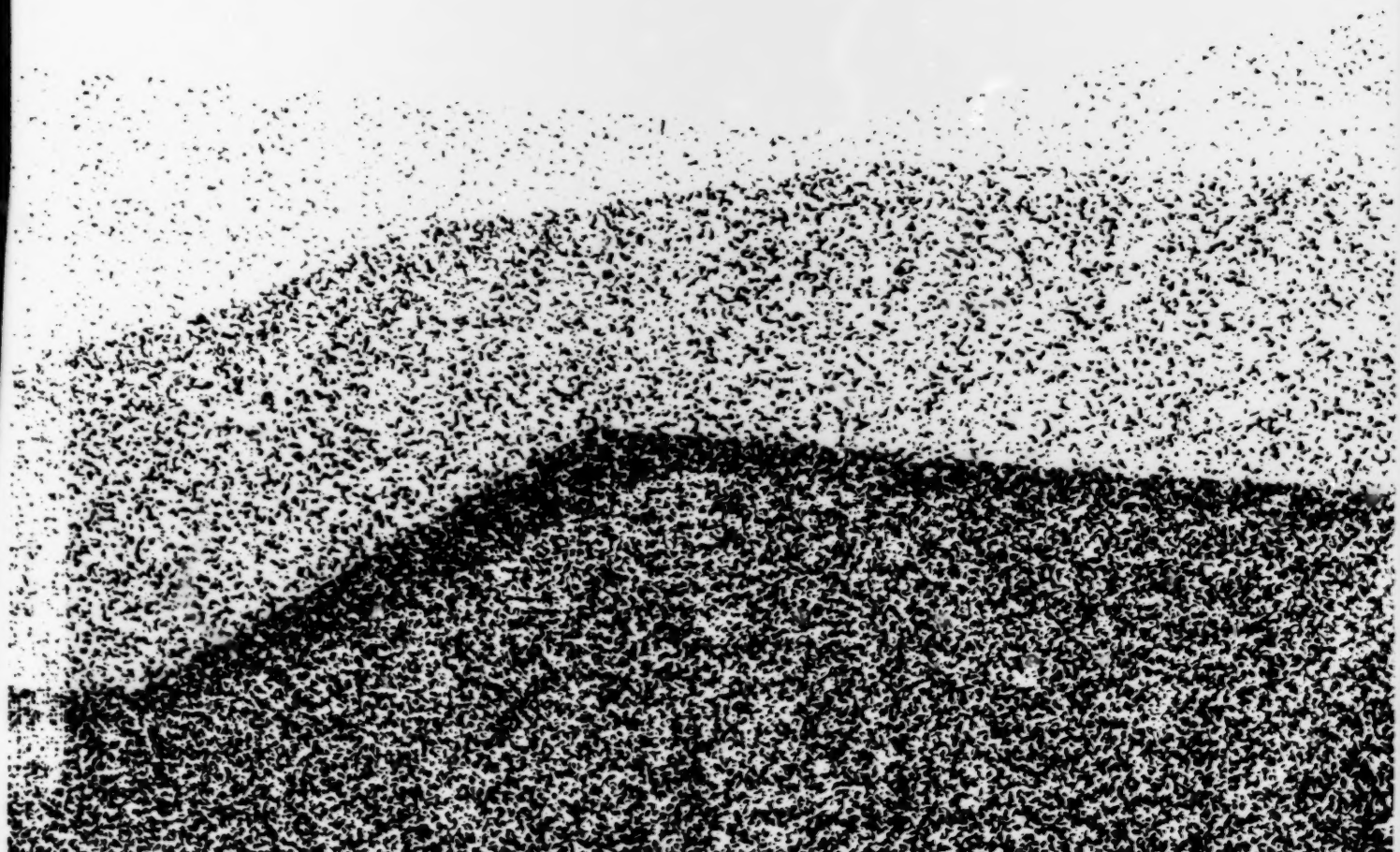


**Value-Added Taxation:  
Issues and Impact for  
Canadian Mines**

**BRENDA J. DYACK**

Working Paper No. 38



87-00432/

**VALUE-ADDED TAXATION:  
ISSUES AND IMPACT  
FOR CANADIAN MINES**

**Brenda J. Dyack**

**Centre for Resource Studies  
Working Paper No. 38  
November 1986**

**Canadian Cataloguing in Publication Data**

**Dyack, Brenda J.**

**Value-added taxation: issues and impact for Canadian mines**

**(Working paper, ISSN 0226-7616; no. 38)**

**Bibliography: p.**

**ISBN 0-88757-079-8**

**1. Value-added tax - Canada. 2. Mineral industries - Taxation - Canada. 3. Mines and mineral resources - Taxation - Canada. I. Queen's University (Kingston, Ontario). Centre for Resource Studies. II. Title. III. Series: Working paper (Queen's University (Kingston, Ontario). Centre for Resource Studies); no. 38.**

**HD9506.C32D93 1986**

**336.2'714'0971**

**C86-095095-6**

**© Centre for Resource Studies, 1986  
Queen's University**

## FOREWORD

This paper represents research sponsored by the Centre for Resource Studies and aimed at improving the understanding of the policy implications for the Canadian mineral industry of proposed government changes, in this case the replacement of the federal manufacturers' sales tax with a form of value-added tax. The Centre's working papers are offered for information and discussion, and seek to encourage feedback and additional research in mineral policy. Opinions presented are those of the author, and do not necessarily represent the views of the Centre or its sponsors.

Margot J. Wojciechowski  
Centre for Resource Studies



## CONTENTS

Foreword / iii

Summary / vii

Resume / viii

1. Introduction / 1

2. General Value-Added Tax Issues / 3

    Overview of Commodity Taxation / 3

    Value-Added Tax Characteristics / 11

    Rate Issues and Value-Added Tax / 17

    Price Impact of VAT / 22

    Trade Effects / 23

3. The Mining Industry and VAT / 25

    Data and Assumptions / 25

    Accounts Approach to VAT Calculations / 27

    Credit/Invoice Approach to VAT Calculations / 31

4. Problem Areas in the VAT Calculation / 33

    VAT and Sales Taxation / 33

    Treatment of Exports / 35

    Cost of Capital Goods and Depreciation / 40

    Transportation Costs / 41

    Treatment of Imports / 41

    Taxation of Inventories / 41

    Adjustments for MST Paid / 43

    Treatment of Interest and Rent Payments / 43

    Treatment of Exempted Goods / 44

    Government Goods and Services / 48

    Subsidies / 48

    Treatment of Leases / 49

    Royalties, Resource Taxes and Income Taxes / 49

    Water Taxes / 49

    VAT as a Deduction for Income Tax Purposes / 50

    Profitable Versus Loss-Position Firms / 51

    Land / 51

    Sales of Assets / 51

    VAT and Owned Subsidiaries / 51

    Costs of Tax Compliance / 52

5. Summary of Conclusions / 53

References / 55

The Author / 57

Centre for Resource Studies / 58

CRS Publications / 59

## **TABLES**

1. Production and Sale of a Good: No VAT / 11
2. Production and Sale of a Good, 10% VAT, Subtraction Method  
Accounts Approach: All Transactions Net of Tax / 14
3. Production and Sale of a Good, 10% VAT, Subtraction Method  
Accounts Approach: All Transactions Gross of Tax / 14
4. Production and Sale of a Good, 10% VAT, Subtraction Method  
Accounts Approach: Firm C Exempted / 14
5. Production and Sale of a Good, Subtraction Method Credit/Invoice  
Approach / 16
6. A Representative B.C. Mine: Costs of Intermediate Production  
Inputs / 26
7. A Representative B.C. Mine: Value Added Calculation - Current  
Situation / 27
8. Replacement of MST With VAT - Accounts Approach / 28
9. A Simplified VAT Calculation for a B.C. Mine: Accounts  
Approach / 31
10. Replacement of MST with VAT: Credit/Invoice Approach / 32
11. Example of VAT With PST Levied Last / 34
12. A B.C. Mine With Some Exports - Accounts Approach / 37
13. A B.C. Mine With Some Exports: A Quick Calculation / 38
14. An Example of an Exporting Firm / 39
15. VAT Effects With and Without Inventory Build-up / 42
16. Standard Example from Table 8 Adjusted to Include Interest Costs,  
Accounts Approach / 45

## SUMMARY

The Canadian government recently announced its intention to replace the manufacturers' sales tax (MST) with a version of value-added tax (VAT) called the business transfer tax (BTT). This has raised a number of concerns about the potential impact of the proposed change on profitability, its effect on competitive position domestically and in export markets, and the costs and administrative complications associated with compliance.

For Canadian business in general, the BTT can be expected to offer a number of advantages over the existing MST:

- it will eliminate distortions in production and consumption decisions resulting from the uneven application of MST;
- it will eliminate any hidden MST presently burdening exports in the form of tax on intermediate inputs and capital equipment, and it will not apply to exports;
- it will eliminate the present bias in favour of imports under the MST;
- if the goal is simply to generate the same revenues as the present MST, the rate of the BTT will be much lower than the current MST rate, although the incidence of the tax will be much broader.

The Canadian mining industry exports about 80 percent of its output in value terms. It therefore stands to gain substantially from the second advantage noted above, namely the elimination of MST buried in the cost of exports.

In this study, a mine model based on actual data is used to evaluate the potential impact for mining companies of the replacement of MST with a VAT. The results of sensitivity analysis on the model indicate that the introduction of VAT can be expected to increase profits for mining firms, whether all outputs are exported or some are sold domestically.

The model also demonstrates that the actual calculations that will be required for compliance with the new tax can be relatively simple, contrary to current perceptions.

In this study a number of practical problems arising in the VAT calculations are anticipated and discussed, including treatment of capital goods, interest, inventories, MST already paid, exempted goods, government goods and services, land, and subsidiaries.

Overall, the analysis supports the view that the VAT will be of benefit to the industry, although compliance costs can only be speculated upon at this time.

## RESUME

Le gouvernement canadien a récemment annoncé son intention de remplacer la taxe sur les ventes du fabricant (TVF) par une version de taxe à la valeur ajoutée (TAV) appelée taxe sur les transactions commerciales (TTC). Ce changement éventuel soulève un certain nombre de questions sur son impact potentiel, sur la rentabilité, sur son effet sur la position concurrentielle sur les marchés intérieurs et extérieurs, et sur les frais et les complications administratives qui s'ensuivront.

Pour les entreprises canadiennes en général, on peut s'attendre à ce que la TTC offre un certain nombre d'avantages que n'avait pas la TVF:

- elle éliminera les distorsions dans les décisions sur la production et la consommation qui résultaient d'une application inégale de la TVF.
- elle éliminera toute TVF cachée affectant actuellement les exportations sous la forme de la taxe sur les facteurs intermédiaires et les biens d'équipement, et elle ne s'appliquera pas aux exportations.
- elle éliminera la partialité dont bénéficient actuellement les importations grâce à la TVF.
- si l'objectif est simplement la génération des mêmes revenus qu'avec la TVF actuelle, le taux de la TTC sera bien inférieur à celui de la TVF, bien que l'incidence en soit beaucoup plus large.

L'industrie minière du Canada exporte environ 80% de sa production si l'on se base sur sa valeur. Elle serait donc nettement avantagée si la TVF cachée dans le coût des exportations était éliminée.

Dans cette étude, on se sert d'un modèle de mine basé sur des données réelles pour évaluer l'impact potentiel pour les compagnies minières du remplacement de la TVF par une TAV. Les résultats d'une analyse de la sensibilité faite sur ce modèle indiquent que la création d'une TAV augmentera probablement les profits des compagnies minières, que toute la production soit exportée ou qu'une partie en soit écoulée sur les marchés intérieurs.

Contrairement aux idées reçues, le modèle démontre aussi que les calculs qui seront effectivement requis pour se conformer à cette nouvelle taxe peuvent être relativement simples.

Dans cette étude on anticipe et on discute d'un certain nombre de problèmes pratiques relatifs aux calculs de la TAV, notamment le traitement des biens d'équipements, l'intérêt, les inventaires, la TVF déjà payée, les biens exonérés, les biens et services publics, les terres et les filiales.

En général, l'analyse appuie la théorie selon laquelle la TAV sera favorable à l'industrie, bien qu'à l'heure actuelle on ne puisse déterminer avec précision combien il lui en coûtera de s'y conformer.

## 1. INTRODUCTION

A value-added tax (VAT) is an indirect multi-stage commodity sales tax which is applied to the value added at each stage of the production process. The sum of values added at each stage is, in principle, equal to the final retail sales value of the commodity.

Since the 1950s, the VAT has been an increasingly popular instrument for collecting government revenues in many countries. The Canadian government recently announced its intention to introduce a VAT which is being called a business transfer tax (BTT). In the early discussions, the government indicated that the BTT was intended to replace the existing federal manufacturers' sales tax (MST). The BTT differs from the versions of VAT in use in most jurisdictions principally in its methods of calculation, as will be explained in more detail below.

Naturally there is a great deal of apprehension concerning the impact of a new and unfamiliar tax, in a variety of areas of concern to all sectors. For example:

- since the proposed new tax was initially intended to replace the federal MST, there are questions about the relative advantages and disadvantages of each;
- questions have been raised as to why the BTT would be preferable to a federal retail sales tax;
- there is concern that calculations and records required to implement the VAT will increase the complexity and the cost of both compliance and administration;
- there is a fear that a BTT will increase tax burdens, thus reducing profits;
- there is confusion about the potential impact of a VAT on domestic prices and on Canada's international trading position.

Chapter 2 addresses these global issues. Since the federal government has not yet made clear the exact form that the Canadian BTT will take, a variety of characteristics of the VAT are identified, to familiarize the reader with the options that are available, along with their relative merits and defects.

Chapters 3 and 4 deal with matters of specific concern to the mining industry. Chapter 3 contains an impact analysis of VAT for a representative mine. The analysis takes the reader through an actual VAT calculation for a mine and provides an estimate of the impact on value added of replacing the manufacturers' sales tax with a value-added tax. Prob-

lems associated with each stage of the calculation are highlighted, including:

- the treatment of provincial sales tax in conjunction with the value-added tax;
- the treatment of exports;
- the taxation of interest payments;
- the complications presented by exemptions.

Other items, which cause no problems in the actual tax calculation but may cause some apprehension on the part of taxpayers, are discussed as well. These include:

- the treatment of capital goods and depreciation;
- the treatment of transportation costs;
- the taxation of inventories;
- the treatment of mineral leases and mineral taxes.

Until the details of the proposed tax have been published, one can only speculate on the specific treatment of some items. This paper therefore provides examples of various possible options, to aid the reader in forming an opinion on a preferred treatment. Comparisons are also presented between the known basic features of the proposed Canadian approach to value-added taxation and the approach adopted by other countries, to permit readers who are familiar with existing regimes to see the differences, and so that others who are as yet unfamiliar with value-added taxation can judge for themselves which approach they would prefer.

This paper was written before the federal government indicated that, instead of being simply a replacement for the federal MST, the BTT will be introduced as part of a major tax reform initiative in Canada. For this reason, the study addresses only the first step, replacement of MST, in analyzing the potential impact of the BTT on the mining industry. The ultimate effect will depend as well on any additional changes that may be made to other revenue instruments, particularly corporate income tax.

## 2. GENERAL VALUE-ADDED TAX ISSUES

### Overview of Commodity Taxation

Federal sales taxation at the manufacturing level has existed in Canada for sixty years. Although a number of commissions and committees have criticized it on economic grounds over the years,<sup>1</sup> the system has been retained. The MST has survived for so long partly because it is a familiar quantity to the business community, it is largely hidden from the general public, and, perhaps most importantly, the arguments in favour of abolishing it have been around for so long that they seem to have lost their sense of urgency. Among the alternatives that have been suggested is a tax on value added. Consequently, the announcement in the February 1986 federal budget speech of the government's intention to introduce a form of VAT, the business transfer tax, was no surprise to the business community, although the proposal has been a long time in coming.

Although the possibility of a Canadian tax on value added has been discussed for some time, there is still a great deal of uncertainty on the part of the general public about the effect this tax will have on the economy. The particular emphasis of this study is on the impact of a value-added tax for the mining industry. It will also be useful to put the new tax in perspective initially by comparing it in general terms to the old system of federal sales taxes that it will replace; this is done in the next section, along with a discussion of the VAT and the retail sales tax. Hopefully, these comparisons will remove some of the mystery.

### Federal Sales Taxes<sup>2</sup>

Federal sales taxes are considered to be indirect taxation, for two main reasons:

1. See, for example, Canada, Report of the Royal Commission on Taxation, vol. V (Ottawa: The Queen's Printer, 1966) and Canada, Report of the Federal Sales Tax Review Committee, (Ottawa: Supply and Services, 1983).
2. This section benefited enormously from the work of Malcolm Gillis which reviews the costs and benefits of federal sales taxes. See in particular Malcolm Gillis, "Federal Sales Taxation: A Survey of Six Decades of Experience, Critiques and Reform Proposals", Canadian Tax Journal, 33, 1, 1985, pp. 68-98; and Malcolm Gillis, "Excising Excises: Federal Sales Tax Reform in Canada", Proceedings of the Thirty-Sixth Tax Conference, 1984, (Toronto: Canadian Tax Foundation, 1985), pp. 460-524.

- they are not paid by consumers directly to the government, but instead are collected by businesses which in turn forward revenues to the government;
- they represent an indirect tax on incomes.

Federal sales taxes, although not defined in this way in the legislation, can be thought of as comprising two types of tax: the excise tax on a few final consumption goods including tobacco, cigarettes, and gasoline; and the manufacturers' sales tax, applied before the final consumption stage on many, but not all, manufactured goods. It is speculated that the excise taxes will remain; in any case, the issues concerning their use are quite different from those concerning the MST. It is the MST only that is the focus of the following comparison.

The Canadian MST is a complicated tax, with three rates and many exemptions. The current basic rate is 12 percent; a higher rate of 15 percent applies only to tobacco and alcohol, and a lower rate of 8 percent generally applies to construction materials and to cable and pay T.V. services.

A wide range of exempted goods has evolved over time, in response to political and economic pressures. Exemptions include: food, drugs, clothing, electricity, and home-heating fuels. Exempted goods of interest to the mineral sector include production equipment, processing materials, plans or drawings related to production, and exploration machinery and apparatus. Since the output of the mining sector is not a manufactured product, there is no MST levied on mineral sales.<sup>3</sup>

It is difficult to estimate the actual amount of federal sales tax paid by an industry. Invoices do not always include federal sales tax as a separate item. Mining companies in particular do not monitor federal sales taxes paid on inputs or on outputs, because the tax paid on inputs is viewed simply as an integral part of the cost of the purchased inputs, and no tax is paid on their own outputs. Nevertheless, the Mining Association of British Columbia, on the basis of estimates provided by its member companies, reports that in 1984 those companies paid \$13 million in federal sales tax, up from an estimated \$7 million in 1983 and \$6 million in 1982. These amounts have represented less than one percent of mining revenues in the last few years.<sup>4</sup>

A number of arguments have been put forward for abandoning the MST. Principally, it is argued that:

- it is nonneutral, distorts production and consumption decisions, and leads to economic inefficiencies;

3. Sales would be taxable if they were made to a final consumer.

4. The Mining Association of British Columbia, "The British Columbia Mining Industry in 1984", Vancouver, 1985.

- it has a very narrow base, due to the large number of exemptions that has evolved;
- it is tremendously complicated, as a result of endless tinkering over the years;
- it is very susceptible to pressures for concessions from particular interests;
- it introduces an unintended hidden tax on exports;
- it has a bias in favour of imports over domestic production.

These and other problems are discussed in more detail below.

Since the tax is non-neutral and alters behaviour, it leads to inefficiencies in the economy, and therefore to a lower total output than would be the case in its absence.<sup>5</sup> Part of the nonneutrality arises because the MST does not represent the same proportion of final value of all finished goods. If a large proportion of inputs are exempt, or if a large proportion of value has been added after the manufacturing stage of a product, then the tax will represent a relatively small proportion of the purchase price. Other final goods will have a much higher MST content. The relative prices of goods are therefore affected, and consumer preference will shift towards the types of goods that are less-heavily taxed. This switch in turn causes a reduction in consumer satisfaction as less of the heavily-taxed items are purchased; it also leads to a reduction in tax revenues.

Related to this is the fact that some but not all items entering the production of a good are themselves subject to MST. For mining, for example, goods explicitly excluded from the exemption for production equipment are: ash hoppers, waterlines for use with mining machines and stopers, and wire and fittings including light bulbs for mine lighting. For taxable manufactured goods, the final cost will include the cost of MST for a variety of its inputs. The pyramiding effect will vary, and lead to discrimination against goods with a higher proportion of contained taxable manufactured goods.

Although exemptions free a great deal of the production materials and equipment from the manufacturers' sales tax, in 1980 for example, 49 percent of federal sales tax revenues came from tax on capital goods and intermediate inputs.<sup>6</sup>

5. The distortion imposed on the economy by taxation of goods at the manufacturing stage is a well-documented part of economic theory. For one treatment see Richard A. Musgrave and Peggy B. Musgrave, Public Finance in Theory and Practice, (New York: McGraw-Hill, 1984).

6. Canada, Department of Finance, "Why A VAT?", Ottawa, 1985, mimeo.

For the firm, one effect of non-neutrality will be an attempt to shift as many as possible of the production activities beyond the manufacturing stage where the tax is levied. This will tend to distort production and distribution methods, arbitrarily discouraging forward integration by manufacturers and encouraging backward integration by retailers. Furthermore, when some production items are taxed, there is a bias created towards the use of more labour and less capital.

The MST distorts the choice of location of firms. Since the value of manufactured goods which is taxable includes the transport costs of inputs to manufacturing firms and of outputs to wholesalers, there is an artificial tax-induced incentive for manufacturers to locate closer to the source of inputs and for wholesalers to locate near manufacturers.

The MST has become increasingly complicated over the years, as a result of special pleadings and concessions, combined with the government's attempts to increase equity in the system. For example, the concept of "notional values" was introduced to implicitly compensate retailers for the fact that wholesalers pay lower prices to manufacturers than do retailers. Without notional values, higher manufactured-goods prices for retailers mean that retailers pay a greater amount of MST, and in this sense are discriminated against. The lower notional values used for MST purposes is the awkward method adopted to reduce this discrimination, but one which applies only to some goods.

The wide range of exemptions that has been introduced over the years is largely due to the susceptibility of the MST to such special pleading, and to other political and economic pressures. Health services, for example, have won exemptions on many products used in health care. Individual firms win exemptions, and their competitors seek similar treatment. Exemptions have become increasingly narrowly defined, making the regulations long and complex,<sup>7</sup> and making compliance confusing and costly.

An additional result of the growth in number of exemptions is a narrow and shrinking tax base, leaving fewer and fewer remaining taxpayers to bear a growing tax burden. One recent estimate placed the federal sales tax base at only 40 percent of total consumption expenditures; this figure includes the federal excise taxes on gasoline, alcohol, and

---

7. As extreme examples, exemptions include the following: blast furnace slag and boiler slag not further processed than crushed and screened; war veteran badges; and ice. For further details see CCH Canadian Limited, Sales Tax Guide Canada, 33rd Edition, (Toronto: CCH Canadian Limited, 1986).

tobacco.<sup>8</sup> Another finds that the federal sales tax base is 31.8 percent of consumption.<sup>9</sup>

A much broader base, with either the current MST system or a new value-added tax, would reduce the burden for existing taxpayers, provided that government revenue requirements from sales taxation did not change. If more tax is to be collected, then a switch to a broad-based value-added tax may not result in much reduction for existing taxpayers; the difference will be that current non-taxpayers will be drawn under the tax net, and will help share the burden. With full tax shifting, all final consumption goods would include the same percentage of tax in their prices. No one good would be preferred over another because of a tax-induced distortion, and the tax burden on all producers would be the same. Firms not currently taxable would lose their price advantage as taxes are passed forward to consumers. Retention of the MST with an expanded tax base could reduce the burdens for some, but the serious imbalance of tax burdens on different goods would persist.

The discriminatory hidden tax on exports arising from the MST results from the fact that exports, which are nominally exempt from MST, carry some "buried" tax in their final prices. Although the total amount is probably fairly low (estimated to be no higher than one percent in 1980)<sup>10</sup> it nevertheless is a negative factor in the competitive position of Canadian exporters.

The MST's bias in favour of imports over competing domestic goods results from the fact that imports are taxed on entrance value less transportation costs to Canada. Canadian goods' taxable values also include advertising, warranty and distribution costs, and may include substantial internal transportation costs as well. There are two results: first, potential sales tax revenues are forgone because importers have a lesser tax imposed and this means more revenues must be raised from other taxpayers; and second, the tariff protection provided to domestically produced goods is eroded, in a manner that is "difficult to predict, arbitrary, and capricious".<sup>11,12</sup>

---

8. Sijbren Cnossen, "What Kind of Sales Tax? - Critique of a Government Paper", Canadian Tax Journal 23, 1975, pp. 505-519.

9. Canada, Department of Finance, "Why A VAT?", Ottawa, 1985, mimeo.

10. Chun-Yan Kuo, Thomas C. McGirr and Satya N. Poddar, "On Measuring the Effective Federal and Provincial Sales Tax Rates in Canada", (Ottawa: Department of Finance, 1985), mimeo.

11. Malcolm Gillis, "Federal Sales Taxation: ...", p. 80.

12. Effective protection is a measure of the actual protection afforded domestic goods. This is not well indicated by the legislated tariff rates.

### Retail Sales Tax

A retail sales tax is an indirect single-stage tax with the tax rate applied to the final sale of a good, usually on an ad valorem basis, i.e. on the final sales value. The value-added tax, as noted previously, is a multi-stage tax applied to value added at each stage of the production of a good. If the tax base is the same, a retail sales tax is essentially equivalent to a value-added tax of the same rate. Since the sum of values added at each stage is just equal to the final value of a good, a tax applied to the values added at each stage must collect the same revenue as a tax on the sum of values added. The difference between the two taxes is in how and from whom the tax revenue is collected.<sup>13</sup>

The value-added tax should not be confused with the cumulative multi-stage cascade or turnover tax, where the tax also is applied at each stage of production, but to the total sale price at each stage. Total sale price includes the value added in the given stage of production but also includes the cost of intermediate inputs. Cost of intermediate inputs includes the value added in previous stages of production. For a given tax rate, the turnover tax generates a greater tax revenue than either a retail sales tax or a value-added tax, and represents a greater percentage of final sales value; in fact, it will exceed the nominal rate of tax officially in force. The turnover tax is unfair because the total tax paid, as a percentage of final product price, will be different for different goods and will vary depending upon the number of stages of production. It discriminates against products which go through many stages. It also encourages vertical integration, since taxes can be avoided if the unfinished product changes hands fewer times.

The retail sales tax and the VAT, assuming each has a general base and a single rate, are considered to be among the most neutral indirect taxes.<sup>14</sup> They avoid the problems of the MST discussed above. In addition, since the tax base for the proposed BTT version of the VAT would be much broader than that for the MST, the tax rate required to raise the same revenues can be much lower (estimated at 2 percent to 2.5 percent in 1985).<sup>15</sup> A lower rate would enhance public acceptance, and

13. See the methods of calculation later in this chapter for an illustration of this.

14. The neutrality issue is well established and discussed extensively elsewhere. See John F. Due, "The Dilemma of Canadian Federal Sales Tax Reform", in Report of Proceedings of the Twenty-Seventh Tax Conference, (Toronto: Canadian Tax Foundation, 1976), pp. 188-206 and Robin Boadway and Harry Kitchen, Canadian Tax Policy, Canadian Tax Paper No. 63, (Toronto: Canadian Tax Foundation, 1980); and Malcolm Gillis, "Federal Sales Taxation: ...".

15. Canada, Department of Finance, "Why A VAT?".

reduce any possible incentive to evade the tax. The excess burden of the tax (i.e. the net cost to society of the reduced consumption caused by the imposition of the tax) will be lower with a lower tax rate.<sup>16</sup>

In theory, since a retail sales tax and a VAT are equivalent, it would appear that either could be used to replace the MST. At first glance, a federal retail sales tax even seems to offer some practical advantages. For example:

- since provincial sales taxes are already widespread, the education and compliance costs would be lower;
- since only retail firms would be involved with a retail sales tax, as opposed to virtually all firms with a VAT, the administrative costs would be lower for business and for government;
- joint federal/provincial administration, if introduced, could reduce related provincial administration costs.

However, there are political considerations that outweigh these apparent advantages. Principal among these is the political fact that the retail sales tax is viewed as an exclusively provincial revenue instrument. Furthermore, it is already the most unpopular form of taxation in Canada and therefore its adoption by the federal government appears to be politically unwise.<sup>17</sup>

Among the other advantages of the VAT over retail sales tax is that the VAT facilitates removal of all exports from the tax base, as well as the exemption of production equipment. It may also facilitate compliance, since the tax will be collected at many stages, rather than just the final retail stage, making evasion as a whole both less likely because of the small amounts involved at each stage and more difficult in the sense that several acts of evasion would be required to evade the tax in total. However, since Canadians are known to be very tax compliant, this last benefit may not be a major one in this country.

#### Problems Associated with Switching to a VAT

Replacement of the MST with a VAT will entail a number of costs, which must be weighed against the benefits enumerated previously. The costs arise from factors such as the following:

16. Excess burden is the net cost to society of the reduced consumption caused by the imposition of the tax. The excess burden increases with the square of the tax rate. See Richard A. Musgrave and Peggy B. Musgrave, Public Finance in Theory and Practice.
17. Robin Boadway and Harry Kitchen, Canadian Tax Policy.

- the changeover will carry administrative costs for government and the private sector;
- although overall equity will increase, many new taxpayers will be drawn into the net, losing any price advantage they may have had as a result of MST exemptions;
- newly taxed firms will have to begin accounting for taxes payable (although the regulations and therefore the accounting process will be simpler than with MST, because VAT is more universally applied).

The most heated resistance to value-added taxation has come from those who fear that it will be an administrative nightmare, with paperwork costs which outweigh the benefits associated with the system. Each taxpayer will have more paperwork, it is argued, and many more taxpayers will be involved than with the MST (or even a federal retail sales tax); therefore, both business and government will have a greater administrative burden.

It is impossible to provide a good estimate of government administration costs plus business compliance costs.<sup>18</sup> However, Gillis makes an interesting point which emphasizes the comparative costliness of the MST: the complexity of the existing federal manufacturers' tax system has in fact caused widespread overpayment of the federal sales tax. A VAT would eliminate this current compliance cost, since it would be relatively easy to determine the amount of VAT paid on inputs which would be rebated or passed forward to consumers, as will be explained in chapter 3.

#### Overview Conclusion

It appears likely that a form of VAT will be introduced in Canada. The reasons for the switch from MST to VAT are economically sound, and it is expected that the result will be an improvement in the performance of the economy as a whole. The impact on the mining industry in particular will be investigated in chapter 3.

The rest of chapter 2 describes the structure of value-added taxation, and summarizes its expected impact on Canadian prices and international trade.

---

18. Malcolm Gillis, "Federal Sales Taxation: ...".

### Value-Added Tax Characteristics

A value-added tax, as noted above, is a multi-stage commodity sales tax which is applied to value added. It offers improved economic efficiency over a manufacturing tax which is not broadly based and which is applied to total sales value. A VAT is better because it takes a much more constant proportion of consumer expenditure and removes tax-induced relative price differences. With full shifting forward of the tax to the consumer, the tax proportion of final price will be the same for all taxed goods and services. If all goods and services are taxed equally, then no relative price changes will occur.<sup>19</sup>

### Types of Value-Added Tax

Table 1 shows the stages of production of a hypothetical good and the value added (sales less purchases) generated at each stage. The sum of values added for all stages is just equal to the final retail value of the good charged by Firm D. The value-added tax is applied to the value added at each stage.

Table 1

#### PRODUCTION AND SALE OF A GOOD: NO VAT

|             | Firm A | Firm B | Firm C | Firm D |
|-------------|--------|--------|--------|--------|
| Sales       | 100    | 300    | 600    | 1,000  |
| Purchases   | 0      | 100    | 300    | 600    |
| Value added | 100    | 200    | 300    | 400    |

This simple explanation hides some important details. The tax can be of three types, depending on the extent of the tax base: gross product, income, or consumption VAT. These three types are described below, followed by explanations of the three possible ways of calculating the tax: addition, subtraction using the accounts approach, or subtraction using the credit or invoice approach.

19. Kul B. Bhatia, "Value-Added Tax and the Theory of Tax Incidence", Journal of Public Economics, 19, 1982, pp. 203-223.

## **Gross Product Type VAT**

For this type of VAT, the economic base is similar to gross national product. This means that capital equipment costs are taxable and the VAT paid on them is not deductible from tax paid on output. Tax paid on all other purchased inputs is deductible. This type of VAT is not used currently by other jurisdictions because, of all the types of VAT, it places the heaviest burden on capital goods and therefore discriminates against capital-intensive production methods. It discourages saving and forces firms to defer capital investment, which means delayed replacement and modernization.

## **Income Type VAT**

The tax base for an income type of VAT is similar to net national product, which means that the calculation of the value added which is taxable allows for the deduction of purchased intermediate inputs and depreciation on capital goods but not the total cost of capital equipment purchases. This type of VAT requires the calculation of depreciation allowances, always a difficult problem since the depreciation path must be estimated. There is also the problem that taxpayers try to classify capital expenditures as current expenditures so that they can be deducted for the purpose of calculating value added.

## **Consumption Type VAT**

All business purchases are deductible in this type of VAT, including purchased intermediate inputs and capital expenditures. The tax base ends up being similar to total private consumption expenditures, and the problems of the other two types noted above are avoided. The VAT based on consumption is neutral between production methods and therefore there is no bias against capital. This type of VAT is the one used by European countries and is the one most likely to be used in Canada. All further discussions are based on a consumption type VAT.

## **Methods of Calculation**

### **Addition Method of Calculation**

Value added for a stage of production equals sales value less purchased intermediate inputs, and therefore value added represents all payments to

labour and capital. The addition method of calculating VAT relies on this fact, and involves adding up wages, rent, interest and net profit. Full expensing of capital equipment purchases is permitted, since we assume a consumption type VAT. When the value added has been determined, the firm applies the VAT rate and remits taxes payable.

#### Subtraction Method of Calculation

Whereas the addition method involves direct addition of the components of value added, the subtraction method arrives at the value added indirectly, by subtracting purchased input costs from sales. There are two ways of calculating VAT payable using the subtraction method: the accounts approach and the credit or invoice approach.

#### Subtraction Method: Accounts Approach

In the accounts approach, the subtraction method described above is used to calculate value added and then the VAT rate is applied to this amount. For this approach, firms must keep a record of all purchased input costs and all sales values for the period for which VAT is payable. Tables 2-4 show the production and sale of a good, when a VAT of 10 percent applies and tax liability is calculated using the accounts approach. In table 2, all transactions are shown net of the tax. At each stage, firms calculate value added as "sales less purchases", and apply the VAT rate of 10 percent. The sum of values added is \$1,000 and the sum of value-added tax is \$100. \$1,000 is also the retail value net of all tax. Table 2 is misleading, because it ignores the forward shifting of the tax.

Table 3 illustrates a more realistic calculation using the accounts approach. All VAT is shifted forward, and each firm knows that its purchased input costs include a 10-percent VAT. Each firm's sale price is composed of its purchased input cost including VAT, its value added, plus the VAT it must pay on its own value added. The next firm repeats the process. Value added at each stage is the same as in table 2, but purchases in table 3 always include the VAT, as do sales. Again, the total value added is \$1,000, the sum of taxes is \$100 and final sale price by Firm D to consumers is \$1,100.

If it is not required that each firm show VAT on invoices, then a firm can calculate the VAT that has been paid on purchases by calculating 9.09091 percent of input costs (when the VAT rate is 10 percent). This assumes that VAT has been paid and that it has been fully shifted

Table 2

PRODUCTION AND SALE OF A GOOD, 10% VAT, SUBTRACTION METHOD  
ACCOUNTS APPROACH: ALL TRANSACTIONS NET OF TAX

|             | Firm A | Firm B | Firm C | Firm D | Total |
|-------------|--------|--------|--------|--------|-------|
| Sales       | 100    | 300    | 600    | 1,000  | 2,000 |
| Purchases   | 0      | 100    | 300    | 600    | 1,000 |
| Value added | 100    | 200    | 300    | 400    | 1,000 |
| VAT         | 10     | 20     | 30     | 40     | 100   |

Table 3

PRODUCTION AND SALE OF A GOOD, 10% VAT, SUBTRACTION METHOD  
ACCOUNTS APPROACH: ALL TRANSACTIONS GROSS OF TAX

|                    | Firm A | Firm B | Firm C | Firm D | Total |
|--------------------|--------|--------|--------|--------|-------|
| Sales              |        |        |        |        |       |
| (purchases+VA+VAT) | 110    | 330    | 660    | 1,100  |       |
| Purchases          | 0      | 110    | 330    | 660    |       |
| Value added        | 100    | 200    | 300    | 400    | 1,000 |
| VAT                | 10     | 20     | 30     | 40     | 100   |

Table 4

PRODUCTION AND SALE OF A GOOD, 10% VAT, SUBTRACTION METHOD  
ACCOUNTS APPROACH: FIRM C EXEMPTED

|                    | Firm A | Firm B | Firm C | Firm D | Total |
|--------------------|--------|--------|--------|--------|-------|
| Sales              |        |        |        |        |       |
| (purchases+VA+VAT) | 110    | 330    | 630    | 1,070  |       |
| Purchases          | 0      | 110    | 330    | 630    |       |
| Value added        | 100    | 200    | 300    | 400    | 1,000 |
| VAT                | 10     | 20     | 0      | 40     | 70    |

forward to the next producer. For example, Firm C would make the following calculation of value added:

$$\text{Purchases net of VAT} = \$330 (1 - .09091) = \$300$$

$$\text{Sales net of VAT} = \$600$$

$$\begin{aligned} \text{Value added} &= \text{sales} - \text{purchases (both net of VAT)} \\ &= 600 - 300 \\ &= 300 \end{aligned}$$

To see that .09091 is the correct factor, note that, if sales gross of VAT are \$660 and the VAT rate is 10 percent, then  $.09091 \times \$660$  yields the \$60 VAT, which is 10 percent of the pre-VAT sales value of \$600.

In the accounts approach, each firm is responsible for maintaining the accounts necessary for calculating its VAT payable and these are subject to possible audit by the VAT revenue authorities. Separate accounts of VAT paid on purchases and shown on invoices need not be kept, since net tax payable depends only on the value-added calculation. This is not the case for the credit or invoice approach, described below.

#### Subtraction Method: Credit or Invoice Approach

For this approach, value added is not calculated directly. Instead, the tax payable is calculated indirectly, as: tax due on sales, minus tax paid on inputs including capital equipment. VAT must be shown on all invoices. Taxes paid on purchases will be rebated, and therefore buyers will make sure that correct and full statements of taxes paid are entered on invoices. Tax payment compliance is ensured, since all firms will find it to their own advantage to have taxes reported on invoices.

Table 5 shows this approach to calculating VAT. In order to calculate VAT payable, each firm subtracts VAT paid on purchases from VAT payable on sales. The VAT remitted at each stage is exactly 10 percent of value added at each stage. In contrast to the accounts approach, this approach does not require the direct calculation of value added, although the same VAT liability is arrived at indirectly.

Table 5

PRODUCTION AND SALE OF A GOOD, SUBTRACTION METHOD  
CREDIT/INVOICE APPROACH  
(all invoices show VAT)

|                                                   | Firm A | Firm B | Firm C | Firm D |
|---------------------------------------------------|--------|--------|--------|--------|
| Sales                                             | 100    | 300    | 600    | 1,000  |
| VAT                                               | 10     | 30     | 60     | 100    |
| Total sales value                                 | 110    | 330    | 660    | 1,100  |
| Purchases                                         | 0      | 100    | 300    | 600    |
| VAT                                               | 0      | 10     | 30     | 60     |
| Total purchases cost                              | 0      | 110    | 330    | 660    |
| VAT remitted<br>(VAT on sales - VAT on purchases) | 10     | 20     | 30     | 40     |
| Value added remaining with firm <sup>a</sup>      | 100    | 200    | 300    | 400    |

<sup>a</sup> Total sales value - total purchases cost - VAT remitted = value added.

Summary of VAT Characteristics

The subtraction method has been adopted by virtually all countries where a value-added tax exists. All countries of the European Economic Community which have a VAT use the credit/invoice subtraction approach, mainly because the tax appears on each invoice, which provides a self-policing feature. This does ensure compliance where significant tax avoidance might be expected, but it also involves greater compliance costs for the business sector, even though the actual calculation of VAT owing by each firm is easier when the credit/invoice approach is used. In contrast, the VAT calculation using the accounts approach is more involved for firms; on the other hand, the total administration costs of the accounts approach are lower, because invoices need not show VAT. At the same time, the accounts approach VAT is relatively more costly for governments to administer, particularly because the system is not self-policing, as is the credit/invoice approach.

The business transfer tax proposed for Canada is an accounts-approach VAT. Presumably, it was chosen over the credit/invoice approach because of the preferences expressed by some in the business community.

A very important feature of the value-added tax is that, under any approach to its calculation, the firm is exactly as well off with the tax as without it, as long as there is full shifting forward. This is clear in tables 2 to 5, where value added at each stage of production is the same

as in table 1 where no tax applies. Of course, this could be true of any tax, including the federal sales tax, but unless the tax is universally applied, a producer may have to absorb some of the tax if he is competing for sales.<sup>20</sup>

It is easy to demonstrate that a value-added tax is equivalent to a retail sales tax of equal rate. If a 10-percent retail sales tax is applied in table 1 to the sale of the final product, then the total cost to the consumer is \$1,100. This is identical to the VAT examples, except that here the tax is collected at only one stage rather than at each stage of production.

### **Rate Issues and Value-Added Tax**

Questions concerning what the VAT rate should be and how many rates should exist have aroused a great deal of interest on the part of the tax-paying public. Existing VAT structures elsewhere have included multiple rates and exemptions, and there is concern about how these complications would affect both the burden of the tax and the cost of administering it if they were adopted here as well.

### **The Tax Rate**

There has been concern on the part of some taxpayers that the VAT will be introduced at the same rate as the current standard rate of the federal sales tax on manufactured goods: i.e. 12 percent. The actual VAT rate has not been announced yet; however, there is no reason to assume that it will in fact be 12 percent. If the goal is to replace the current MST with a tax which is better on efficiency grounds then, all other goals aside, it would seem likely that, at least initially, the VAT rate will be designed to raise revenues equal to the revenues lost with the abolition of the MST. In 1985 the federal Finance Department estimated that a 1-percent VAT on a comprehensive base could raise \$2.6 billion, and that the manufacturers' sales tax on all goods other than alcohol, tobacco, and motor fuels could be replaced by a comprehensive VAT of 2 percent to 2.5 percent.<sup>21</sup> These estimates are outdated, since there have been recent increases in the MST rates, but they do indicate that a much lower-rate VAT could replace the existing MST.

---

20. The ability of the producer to pass costs on to the consumer is explored further in the section on price impact later in this chapter.

21. Canada, Department of Finance, "Why A VAT?".

Using the VAT to replace income surtaxes was proposed in the February 1986 budget. In this case, the rate would have to be somewhat higher.

A relatively low VAT rate should be feasible, because a fairly comprehensive VAT base would be much larger than the output of the manufacturing sector, only part of which forms the tax base for the present MST. The burden on the manufacturing sector will become lighter under a VAT, with new taxpayers drawn into the tax net. The manufacturing sector will also be better off because its ability to shift the tax forward will be enhanced. Since all businesses will be taxed, each can shift the tax forward to the consumer; none will suffer relatively more because of the shifting.

There has been concern expressed in the North American popular press about the vast amount of revenue that can be raised for each percentage point increase in the VAT. Such a powerful revenue-raiser for the government is seen as a dangerous "license" for the government to escalate its spending. Once a VAT system is established, small rate increases would seem painless to individual taxpayers but new tax revenues would be large. For those who oppose the growth of government, this aspect of the tax has been emphasized as a negative one. Opponents of the tax fear inevitable increases in the tax rate, enabling governments to claim an ever rising share of society's resources. Proponents view it as an efficient way to raise emergency funds quickly, with as little administrative difficulty and economic distortion as possible.

Both opponents and proponents of the VAT have used European examples as evidence to support their claims. In Europe, the VAT is relied upon heavily for government finances. For example, in 1982 France's VAT revenue represented 42.4 percent of total central government revenues while in Denmark, West Germany, Sweden and the United Kingdom the share was 33.7 percent, 30.9 percent, 26.7 percent, and 18.3 percent respectively. In contrast, the manufacturers' sales tax raised revenues equal to only 10.4 percent of total Canadian federal tax revenues in 1982.<sup>22</sup>

The VAT rates in Europe are much higher than is likely for Canada, at least initially. Sweden has the highest rate, at 23.46 percent, while France, Denmark, West Germany and the U.K. have rates of 18.6 percent, 22 percent, 14 percent and 15 percent respectively. The tax base for VAT is much larger in these countries than the present federal sales tax base in Canada. For example, in West Germany the VAT was applied to 93.6 percent of private consumption of goods and services in 1982, while only 31.8 percent of goods and services consumption was taxed

---

22. Ibid.

under Canada's federal sales tax.<sup>23</sup> (Of course, in Canada the provinces also raise revenue through sales taxes.) Another feature of the European VAT systems is the number of multiple rates. Italy has seven different rates, France and Belgium have four each, some have two, and a few countries have only one.

A broadly-based single rate VAT system offers the advantages of the lowest rate and the fewest economic distortions. These desirable features were noted as "Guiding Design Principles" in the federal Finance Department's 1985 mimeo. A large number of rates is undesirable because if goods are not taxed equally there is distortion in production and consumption decisions, as well as waste and confusion, as noted for the MST.

Multiple rates have been introduced in other jurisdictions to reduce the tax burden on some goods and for some consumers; the rationale has been that a single comprehensive tax rate imposes a heavier burden on low-income consumers. This regressivity arises, it is argued, because low-income earners spend a greater proportion of their income than do high-income earners; therefore the total VAT paid by the lower income group as a proportion of their income is greater than for those with higher incomes. Low VAT rates on such things as food, clothing, public transport and other such staples are the result of attempts to reduce the burden of the tax on those who would otherwise bear the greatest burden.

Canada, however, could use the income tax system to counterbalance the regressivity effect of a VAT, and avoid using multiple rates. The present system of refundable income tax credits means that most people file tax returns even if they owe no tax. It would be a simple matter to expand the credits to include measures designed to offset the burden of a VAT, such as the sales tax credit proposed in the February 1986 budget. Such measures would provide more effective and reliable methods of relieving the burden for some consumers than a multiple-rate VAT. Consumption and production distortions would be avoided, and only those with low incomes could benefit from tax credits or reductions designed to compensate for the VAT's regressivity.

### Zero Rating

When a VAT rate of zero is applied to a good or type of activity, it is totally relieved of all VAT. A rate of zero means that no tax is payable on sales; furthermore, a rebate is due on all VAT paid on purchased intermediate inputs. Zero rating is applied to exports under the destina-

---

23. Ibid.

tion principle of taxation: i.e. when goods are taxed where they are consumed, rather than where they are produced. If, instead, a country follows the origin principle, then its exports will be taxed both at home and abroad, while imports will go untaxed completely and therefore will enjoy an advantage over domestic products.

Under the European VAT systems, it is typical for zero rating to be applied only to exports (the major exceptions are newspapers, children's clothing and food in the U.K.). Extending zero rating to other sectors reduces the tax base and therefore means that a higher tax must be paid by all remaining taxpayers. If some besides exporters are allowed a rate of zero, then lobbying by others for similar treatment can be expected.

### Exemptions

Exemptions from VAT typically have been used for two principal reasons:

- to reduce the regressivity of the tax;
- to exclude some activities from the system, in cases where it is difficult to define the tax base.

Food and medical services are examples of commodities which have been exempted so that some regressivity is removed. Calculation of the value added of banks and insurance companies has presented some problems for tax authorities, so their activities have been exempted.<sup>24, 25</sup>

Exemption means that a good or activity is not taxed when a sale is made. However, unlike zero rating, exemption from paying VAT does not entitle the seller to a refund on VAT paid on purchases. The sale price of the commodity will include some VAT if some of its inputs were taxable and the tax on these inputs is shifted forward. Firms which are exempted need not necessarily be registered with the tax authorities because they neither pay tax nor receive refunds for taxes paid.

The impact of granting exemptions is the same for both the credit/invoice approach and the accounts approach, as long as the exemption applies to the last firm in the production chain. For example, if Firm D in tables 2-4 is exempt, then under the accounts approach this firm would

---

24. Other examples of exempted commodities or activities are previously-occupied immovable property, leasing of immovable property, tuition fees, postal services, land, and newspapers.

25. The problems with taxing financing services are discussed elsewhere. See, for example, Dan Throop Smith, James B. Webber, and Carol M. Cerf, What You Should Know About the Value-Added Tax, (Illinois: Dow Jones-Irwin Inc, 1973).

not be liable for the \$40 of VAT on its value added of \$400. Sales value would be \$1,060, which is \$40 less than the case without exemption. \$60 of this amount represents the VAT paid by firms A, B and C and passed forward by firm D to consumers.

The result will be the same under the credit/invoice approach. Firm D charges no VAT on sales but receives no deduction for input VAT. The price charged includes the cost of inputs plus input VAT and Firm D's value added. The sum of these items is \$1,060. In both approaches, the rate of VAT paid by the consumer will be lower than the standard 10-percent rate when the last firm in the production chain is exempt.

In jurisdictions which use VAT and the credit/invoice approach, exemptions are typically given only at the consumer or retail stage, because undesirable distortions of final sale price occur when exemptions are granted earlier in the production sequence with this approach. Using table 5 this problem can be illustrated.

If Firm C is exempted while all other firms pay tax, then Firm C will charge Firm D \$630: input cost (including VAT) plus value added. Firm D will add value of \$400, to make a sales value (net of output VAT) of \$1,030. Tax on sales is \$103 while credit for VAT on purchases is zero for Firm D. Firm D pays \$103 in tax to the government and passes the cost onto the final consumer who pays \$1030 + \$103, or \$1,133.

With or without the exemption of Firm C, all firms are equally well off because all VAT is shifted to the consumer. The consumer, however, was better off without the exemption of Firm C.<sup>26</sup> The consumer now pays tax at an effective rate of 13.3 percent on this good rather than the 10 percent he paid on goods without exemption.

The result of an exemption prior to the final consumption stage will be a consumption bias away from this good. This would indeed be a perverse result, if the good in question had in fact been chosen for exemption so that it would be lower in price for final consumers. If this is the goal, then it must be firm D which receives the exemption. This will lower the final VAT rate to 6 percent, as illustrated earlier, and the good will be cheaper for consumers, relative to fully taxed goods.

The higher effective VAT rate caused by exemption of Firm C in the credit/invoice approach does not occur with the accounts approach, because here each firm pays VAT directly on its value added, and value added is not affected by exemption. As shown in table 4, exempt Firm C makes purchases worth \$330 and adds value of \$300. It pays no VAT on

26. The assumption here is that all tax can be fully shifted forward to consumers. Clearly this will not be the case if the good in question competes with imports. Imports will bear only a 10-percent VAT and therefore domestic producers would have to absorb the extra tax cost in order to stay competitive.

value added and therefore Firm D is charged \$630 for the output of Firm C (as with the credit/invoice approach). Now Firm D calculates its VAT as 10 percent of value added of \$400, or \$40. Firm D does not automatically add 10 percent VAT to its output value, as in the credit/invoice approach; instead, it adds up its total purchases cost, its value added, and its VAT on value added, and charges consumers \$1,070.

In the accounts approach, firms pay VAT only on actual value added. The exemption of Firm C, which adds \$300 of value to this good, means that the final consumer will pay \$30 less for the good when the rate is 10 percent than if Firm C were not exempt. In the credit/invoice approach, an exemption at a stage before the final stage means that the VAT becomes in part a turnover tax, because VAT is charged on VAT paid in earlier stages.

The issue of exemptions with VAT is quite different from exemptions with the manufacturers' sales tax. Under the MST, the more exempted inputs a firm uses and the more exemptions allowed on output, the better off the firm would be. Exemptions have the effect of lowering costs and prices, so a firm's output can be more price competitive if more exemptions are in effect. With the VAT, this is true only if the accounts approach is used, or if the exemption is limited to the retail stage when the credit/invoice approach is used.

## **Price Impact of VAT**

### **Price Impact for Firms**

The value-added tax is designed to be fully shifted forward at each stage of production. This suggests that the final consumer ultimately pays for the full tax in the form of higher product prices. As a result of the forward shifting, each firm should end up with the same amount of value added remaining on each unit produced after the tax is imposed as before the tax. This was shown earlier in tables 2-5. If consumer prices do in fact rise by the full amount of the tax, and if all consumer commodities are taxed, then all consumer good prices will rise by the same percentage as the VAT rate. With no change in income, consumption must fall as a result of the forward shifting of the VAT, because the real income of consumers will be reduced by a rise in prices. If the monetary authorities accommodate the introduction of the VAT by allowing the money supply to rise, then the reduction in demand can be offset and consumption will not fall. If the money supply is not increased, then producers should expect a reduction in quantities sold, according to the responsiveness of demand and supply in their markets.

For the remainder of this paper, it is assumed that the monetary authorities make the changes necessary to prevent quantity reductions in domestic markets and therefore quantities sold will remain unchanged. The VAT will not apply to exports and therefore export quantities also are assumed to remain unchanged.

### Price Impact for the Economy

The introduction of a value-added tax will probably have a one-shot inflationary effect on the economy. The level of inflation will be directly related to the rate of the VAT, the coverage of the tax base, and the monetary authorities' response to the introduction of the VAT. For example, with all other factors held constant, a 10-percent VAT should raise the average price level by 9 percent, if 90 percent of consumption expenditures is taxed. This price increase would be forthcoming as long as the money supply is increased sufficiently to allow the price rise.

The likelihood of more complete shifting forward of taxes on input costs, combined with the much larger tax base, suggests that the VAT will in fact lead to the inflation indicated in this example. However, the actual inflation will also be a function of various other factors, including the net effect of removing the MST and adding a VAT, the elasticities of demand and supply, the extent to which firms are in fact able to take advantage of the opportunity to shift the tax forward, and the second-round response of wages to the initial price increases.

Experience in Europe indicates that the introduction of a VAT is not "inherently" inflationary. A study by the International Monetary Fund found some related inflation, although only in one country was the VAT identified as the sole source of the inflationary pressure.<sup>27</sup> No evidence was found of any resulting inflationary spiral.

### **Trade Effects**

The introduction of a value-added tax will not, of itself, give a trade advantage to the country introducing it. Assuming the use of the destination principal of taxation, i.e. that goods are taxed where they are consumed, the BTT will zero-rate exports and treat imports exactly the same as goods that are domestically produced and sold. This is in no way a subsidy for exports or a source of special protection for imports;

27. IMF Staff Study, "Is the Introduction of a Value-Added Tax Inflationary", as reported in United States, Office of the Secretary, Department of the Treasury, Tax Reform for Fairness, Simplicity, and Economic Growth, volume 3, Value Added Tax, November 1984.

it simply ensures that a country's goods compete on the same commodity-tax basis as goods produced elsewhere.

In Canada's case, however, the VAT will replace the MST, which presently places a hidden tax burden on Canadian exports, in the form of MST on inputs to production, and offers an advantage to imports in the determination of taxable value. In introducing the VAT, these biases against Canadian producers will be eliminated. This feature is of particular interest to the Canadian mining industry, since a significant portion of its output is exported.

Complete zero rating of Canadian exports will be easy to accomplish, since all purchased inputs will contain the exact percent of VAT prescribed by the VAT rate. This will lower costs to the mine by the amount of MST that was formerly hidden in the final cost of output. Where Canadian producers have power in setting international prices, they could reduce their asking price and/or expand output. Where Canadian producers are price takers (as is the case for most Canadian mining firms), elimination of the hidden MST cost combined with zero rating for exports under VAT is likely to lead to output expansion.

Consequently, the introduction of VAT would lead to expansion of Canadian exports and improved profitability for Canadian exporters. However, expansion of Canadian exports may be modified by exchange rate adjustments. If exports expand, then the value of the Canadian dollar will appreciate relative to other currencies, as long as it is allowed to float. A rise in the value of the dollar will increase the prices paid for our exports by our trading partners, and this will dampen further expansion of exports.

### 3. THE MINING INDUSTRY AND VAT

The remaining chapters are devoted to VAT topics of specific interest to the mining industry. Chapter 3 presents an impact analysis of the tax switch for a representative mine.

The basic VAT calculation is a simple one, and therefore the initial part of the analysis is fairly straightforward and uncomplicated. Furthermore, the actual calculation of value added is not particularly difficult in the case of a mine, and consequently some of the more complicated VAT issues are not a problem for the mining sector. For example, there are no problems of exempting mine output from tax to counteract regressivity. However, treatment of a number of cost items does raise some questions, and chapter 6 deals with these problems.

The methodologies used and the problems highlighted should not be viewed as exclusive to the mining industry; they are in fact applicable and of interest in many sectors of the economy.

#### Data and Assumptions

Table 6 lists the cost categories for the mining firm model. The amounts are derived from an actual mine, but the figures have been adjusted to maintain confidentiality. The use of an actual mine ensures that the cost items are in correct relation to one another and that the amounts are of a realistic order of magnitude. A British Columbia example is used because it allows for the illustration of both provincial sales tax (PST) and B.C.'s water tax. All intermediate input costs are potentially taxable under a VAT regime and so all are listed here. Included are goods as well as services and private as well as publicly supplied commodities. For example, electricity may be supplied by a government-owned public utility such as B.C. Hydro. Services such as recording may also be supplied by the provincial public sector and yet still be taxable. All costs are inclusive of sales taxes levied by the provincial and federal governments, allowing for exemptions currently in force.

Since it has been assumed that a subtraction method of VAT calculation will be adopted in Canada, payments to labour and capital are not included in the costs used to calculate VAT.

Table 6

**A REPRESENTATIVE B.C. MINE: COSTS OF INTERMEDIATE PRODUCTION INPUTS**  
 (\$000s)

|                                                                                  |       |        |
|----------------------------------------------------------------------------------|-------|--------|
| Production materials and supplies other than energy                              |       | 16,570 |
| Energy:                                                                          |       |        |
| Electricity                                                                      | 7,770 |        |
| Natural gas                                                                      | 710   |        |
| Diesel fuel                                                                      | 3,270 |        |
| Gasoline                                                                         | 300   |        |
| Total energy                                                                     |       | 12,050 |
| Professional and technical services                                              |       | 2,150  |
| Contract work                                                                    |       | 230    |
| Machinery, equipment and construction materials                                  |       | 650    |
| Miscellaneous supplies                                                           |       | 410    |
| Miscellaneous services                                                           |       | 410    |
| Outward transportation:                                                          |       |        |
| Road                                                                             | 840   |        |
| Rail                                                                             | 3,455 |        |
| Ship                                                                             | 4,090 |        |
| Warfare & loading                                                                | 990   |        |
| Other                                                                            | 185   |        |
| Total transportation                                                             |       | 9,560  |
| Leases, rentals, free miners' certificates recording fees, assessment fees, etc. |       | 30     |
| Water tax                                                                        |       | 1,080  |
| Total intermediate input costs <sup>a</sup>                                      |       | 43,140 |
| Indirect taxes included in above costs:                                          |       |        |
| Federal manufacturers sales tax                                                  | 310   |        |
| Federal gasoline & fuel oil tax                                                  | 570   |        |
| Provincial sales tax                                                             | 1,780 |        |
| Provincial gasoline & fuel oil tax                                               | 300   |        |
| Total indirect taxes included                                                    |       | 2,960  |

<sup>a</sup> Excluding labour and capital costs, since they are not included in the costs used in the subtraction method of calculating VAT.

The details and concerns associated with specific cost categories are deferred until after initial VAT calculations are made which illustrate the two approaches to calculating VAT. Initially it is assumed that all items listed will be taxed, and that the mining firm sells all of its output domestically so that output is taxed as well. Although this assumption may be unrealistic for a B.C. mine, it is important to set the stage with a basic example before the complication of exports is introduced in table 12.

A further assumption which we will carry throughout this analysis is that the mine produces a mineral which is traded internationally and for which there is no market power on the part of this mine. This assumption means that the price is determined exogenously and therefore price net of VAT cannot change if the VAT is introduced in Canada. Another implication of this so-called "small open economy" assumption is that the MST burden has not been shifted to consumers. Instead, the mine has had to bear the cost of MST in the form of lower-than-otherwise payments to factors of production or profits. The implication of market power on the part of a mine is discussed as a special case at the end of the analysis.

#### Accounts Approach to VAT Calculations

Table 7 shows the value added of the firm as: gross mining revenues, less the total cost of intermediate inputs given in table 6. This illustrates the current situation, with the MST in force.

Table 7

A REPRESENTATIVE B.C. MINE: VALUE ADDED CALCULATION - CURRENT SITUATION  
(\$000s)

|                                                   |        |
|---------------------------------------------------|--------|
| Gross mining revenues <sup>a</sup>                | 84,330 |
| Less total cost of intermediate production inputs | 43,140 |
| Value added (payments to labour plus profits)     | 41,190 |

<sup>a</sup> Includes sales of concentrates, refined metals, coal, asbestos, and other minerals.

Table 8 shows the effect of removing the manufacturers' sales tax and imposing a 10-percent value-added tax. A comparison with table 7 indicates that the mine is better off with VAT, because value added

Table 8

REPLACEMENT OF MST WITH VAT - ACCOUNTS APPROACH  
(\$000s)

|                                                  |        |        |
|--------------------------------------------------|--------|--------|
| A. Gross mining revenues                         |        | 84,330 |
| Intermediate input costs                         | 43,140 |        |
| Less MST                                         | 310    |        |
| Less provincial sales tax on inputs <sup>a</sup> | 1,780  |        |
| Plus new provincial sales tax <sup>b</sup>       | 1,760  |        |
| B. New intermediate inputs costs                 |        | 42,810 |
| C. Value added (A-B)                             |        | 41,520 |
| D. Value-added tax for this mine at a 10% rate   |        | 4,152  |
| .....                                            |        |        |

Net Position of this Mine After VAT

|                                            |        |        |
|--------------------------------------------|--------|--------|
| Gross mining revenues before VAT           | 84,330 |        |
| Plus VAT at 10% of sales                   | 8,433  |        |
| E. Total cost of mine output to purchasers |        | 92,763 |
| VAT paid on inputs                         | 4,281  |        |
| Plus VAT paid on mine value added          | 4,152  |        |
| F. Total VAT passed on to mine's customers |        | 8,433  |
| G. Value added remaining with firm (E-B-F) |        | 41,520 |

<sup>a</sup> The provincial sales tax (PST) in B.C. is 7%. This tax does not apply to services or gasoline and fuel oil. A provincial sales tax is paid on a per unit tax basis on gasoline and fuel oil purchases.

<sup>b</sup> This new value for PST is 7% of the taxable intermediate input cost less MST.

rises.<sup>28</sup> If wages and salaries remain unchanged then this means that profits rise. This particular mine has a net earnings loss of \$1.77 million and therefore the rise in value added of \$330,000 represents a loss reduction of almost 20 percent.<sup>29</sup> In other words, value added rises by 1 percent before income tax.

The calculations in table 8 should not be misinterpreted. It appears at first glance that the mine has traded a tax liability of \$310,000 for one of \$4.15 million under a VAT. This suggests that the mine is much worse off, but this is not the case.

First of all, the choice of a 10-percent VAT rate was arbitrary; 10 percent simply makes calculations easy. In 1985 the federal Finance Department suggested that a VAT rate of 2 percent to 2.5 percent would be sufficient to replace the lost MST revenues.<sup>30</sup> A 2.5-percent VAT would have implied a VAT liability of only \$1.04 million, which looks better than \$4.15 million. However, even with the 10-percent VAT, the mine actually enjoys a cost reduction because it is relieved of MST, which it could not shift forward, and now pays a VAT which can be fully shifted forward. The mine is able to shift forward all VAT paid because all competition, including importers, will also pay the VAT and shift it forward to consumers. This will eliminate a current problem of Canadian competitive disadvantage which results from the fact that competing imported minerals currently have no buried MST.

If the firm wants to know how much input VAT to shift forward to consumers, it must calculate the VAT paid on its purchases because, in the accounts approach, the VAT may not always be shown separately on sales receipts or invoices. The mine can assume that VAT at the standard rate is included in its purchase cost of all inputs. In the example given in this paper, a mine accountant can take 9.091 percent (or 1/11th) of total cost and arrive at the total VAT paid on inputs.<sup>31</sup> Gross of VAT, the mine would have paid \$47.09 million for inputs, which includes

28. If Canada were a "large" country from the point of view of trade in the item under study, then it could be the case that firms would reduce price. For our example it is assumed throughout that Canada is "small" and therefore takes the international price as given. Removal of MST would reduce costs and, with price and output constant, value added would rise.

29. Where provinces levy sales taxes on purchases by the firm, the result will be slightly different than the \$310,000 of MST which is removed, because provincial sales taxes will change when the MST is eliminated. Table 8 and the notes to the table show the impact on provincial sales taxes for this representative B.C. mine. Further discussion of this issue is deferred to the section entitled VAT and Sales Taxation in chapter 4.

30. Canada, Department of Finance, "Why A VAT?".

31. The use of this particular factor was described earlier in the section on VAT characteristics in chapter 2.

\$4.28 million of VAT. The mine passes on this increased input cost to its purchasers. It also passes on the \$4.15 million paid on its own value added.

The total amount of tax that the mine shifts onto its purchasers is the sum of input VAT of \$4.28 million and its own tax on value added of \$4.15 million, or \$8.43 million. This increases the cost of mine sales to purchasers by \$8.43 million: from \$84.33 million when no MST and no VAT apply, to \$92.76 million where a VAT is charged. The total \$8.43 million increase in output value is equivalent to the VAT rate (in this case 10 percent) multiplied by the untaxed value of revenues. This example illustrates both how the VAT increases the value of all sales by the rate of VAT and how the VAT revenue generated by the government is collected in slices at each stage of production.

The bottom line of the calculation shows that, after the VAT has been paid, the firm has \$330,000 more value added than with the MST. This includes the removal of \$310,000 in MST and a reduction in PST of \$20,000. It can be expected that this increase in profits would lead to increased investment and the expansion of output over time.

There is some basis for expecting the mine's position to improve even more than the above figures indicate. This would be the case if the removal of the MST on inputs reduced costs by more than the estimated amount of MST paid. This is possible because the goods which are taxed under the MST themselves contain input goods which also have been taxed under the MST. For this representative firm, the direct reduction in cost of \$310,000 of MST would be augmented by a further cost reduction when the inputs to the mine's inputs have their MST removed as well, as long as the mine's suppliers pass on the cost reduction through lower input prices. Reduced input prices would have an even further cost-reducing impact, through a reduction of PST at each level where MST was levied. The reduced PST at each stage of production of inputs also would filter down to reduced input costs for the mine.

#### A Simplified Accounts Approach

The accounts approach eliminates the need for showing VAT separately on invoices, thus reducing the paperwork for firms. Since VAT paid on inputs is not on the invoices, the firm must either calculate it when it calculates its value added for taxation purposes, or calculate VAT due by using the method shown in table 9. The simple calculation in table 9 allows the mine to subtract total input costs gross of VAT from gross mining revenues gross of VAT. The resulting amount is equal to value added plus VAT payable by the mine. VAT payable by the mine is equal

Table 9

**A SIMPLIFIED VAT CALCULATION FOR A B.C. MINE: ACCOUNTS APPROACH (\$000s)**

|                                                                                     |        |        |
|-------------------------------------------------------------------------------------|--------|--------|
| A. Gross mining revenues before VAT                                                 | 84,330 |        |
| plus 10% VAT on sales                                                               | 8,433  |        |
| Gross mining revenues inclusive of VAT                                              |        | 92,763 |
| B. Intermediate input costs inclusive of VAT (invoices may not show VAT separately) |        | 47,091 |
| Value added inclusive of VAT payable (A-B)                                          |        | 45,672 |
| Less VAT payable by mine $.09091 \times (A-B)^a$                                    |        | 4,152  |
| Value added remaining with the mine                                                 |        | 41,520 |

<sup>a</sup> The factor of .09091 relates only to a VAT of 10 percent. .09091 is just equal to  $VAT \div (VAT \text{ base} + VAT)$ : i.e., if VAT base or sales = \$100, VAT rate = 10%, and VAT = 10, then the factor =  $10 \div 110 = .0909091$ . If the VAT rate is 3 percent then the factor is .0291262.

to 10 percent of value added. It is calculated by multiplying (total revenues gross of VAT less total input costs gross of VAT) by .09091, if the VAT rate is 10 percent.

**Credit/Invoice Approach to VAT Calculations**

In chapter 2 the differences between the accounts and credit/invoice approaches to VAT calculation were discussed and illustrated. Comparison of table 8 and table 10 shows the difference for this representative mining firm. Value added need not be calculated directly in the credit/invoice approach, since the tax liability for the mine is calculated as the difference between tax due on sales and tax already paid on inputs. The tax liability calculated in this way is the same as the tax liability when value added is calculated directly using the accounts approach. In both cases the tax is shifted forward to purchasers and value added remaining with the firm is the same.

Table 10

**REPLACEMENT OF MST WITH VAT: CREDIT/INVOICE APPROACH  
(\$000s)**

|                                                                                                    |        |        |
|----------------------------------------------------------------------------------------------------|--------|--------|
| Gross mining revenues                                                                              | 84,330 |        |
| VAT on output (10%)                                                                                | 8,433  |        |
| Total cost of mine output to purchasers                                                            |        | 92,763 |
| Intermediate purchased input costs                                                                 | 42,810 |        |
| VAT on inputs (10%)                                                                                | 4,281  |        |
| Total intermediate purchased input cost including VAT                                              |        | 47,091 |
| VAT on output less VAT on inputs<br>(8,433 - 4,281)                                                |        | 4,152  |
| Value added remaining with the mine <sup>a</sup><br>(84,330 - 42,810) or (92,763 - 47,091 - 4,152) |        | 41,520 |

- <sup>a</sup> Value added remaining with the mine can be calculated in two ways:
- gross mining revenues before VAT less intermediate purchased input costs before VAT;
  - or, total cost of mine output to purchasers after VAT less total cost of intermediate inputs after VAT less VAT remitted by mine to the government.

#### 4. PROBLEM AREAS IN THE VAT CALCULATION

##### VAT and Sales Taxation

Complications arise when the VAT is levied on goods which are also subject to sales taxation. The assumption so far has been that the VAT rate is applied to the value of sales after excise taxes and ad valorem sales taxes have been levied. It makes no difference in the analysis whether an excise tax is levied before or after VAT, since it is based on the number of units sold and not on the value of sales. However, it does make a difference if an ad valorem tax such as the provincial sales tax (PST) is levied after VAT, instead of before as was assumed in the above calculations. In this section the revenue impact of having the PST levied last is discussed. The resulting bias against exporters is analyzed in the next section.

Provincial sales taxes are at present the last taxes levied. This means that the value of sales, including any MST, is taxed at the current provincial sales tax rate. Removal of MST would reduce PST on inputs for our hypothetical B.C. mine by the PST rate times the amount of MST previously paid, or  $.07 \times \$310,000$ , or \$21,800.<sup>32</sup> Table 8 shows this change rounded to \$20,000, for the sake of simplicity.

Once this initial change to table 8 has been made, there is a very important difference in PST revenues, depending on whether PST is levied before or after VAT. In fact, provincial revenues would be 10 percent higher if the PST rate were applied after the VAT, for the very simple reason that the sales tax base would be 10 percent higher after a VAT of 10 percent had been added to values. From the provincial point of view, this would be consistent with present practice. It would also be a desirable approach, since provincial revenues would be higher.

The point at which PST is levied probably will not affect the mine's value added position, as long as the PST which is paid on inputs is allowed as a cost when mine value added is calculated. PST paid on inputs will rise but VAT paid on inputs will fall by the same amount and therefore total input costs will remain unchanged.

At the governmental level, provincial governments will gain revenues at the expense of the federal government if PST continues to be the last tax levied. This means that, for any given federal revenue requirement, the VAT rate must be higher if PST is the last tax levied.

---

32. Provincial retail sales taxes are not levied on mine output sales since these are not made at the retail level.

If the PST is the last tax levied, the effective rate of VAT will be lower than the published rate, even if the VAT covers all transactions equally in the economy, as shown in table 11.

Table 11

EXAMPLE OF VAT WITH PST LEVIED LAST

|                                               |                       |
|-----------------------------------------------|-----------------------|
| Input cost net of all tax                     | \$60.00               |
| Mine value added                              | 40.00                 |
| Mine output value                             | 100.00                |
| PST rate: 10%                                 |                       |
| VAT rate: 10%                                 |                       |
| <br>A. Input cost                             | <br>\$60.00           |
| VAT at 10%                                    | 6.00                  |
|                                               | <u>\$66.00</u>        |
| <br>B. PST at 10%                             | <br>6.60              |
| <br>C. Total input cost                       | <br>72.60             |
| <br>D. Output value                           | <br>100.00            |
| VAT at 10%                                    | 10.00                 |
| <br>E. Total output value                     | <br>110.00            |
| <br>Value added including VAT<br>(E-C)        | <br>37.40             |
| VAT payable by mine<br>.09091 x (E-C)         | 3.40                  |
| <br>Total VAT paid to government<br>on inputs | <br>6.00              |
| by mine                                       | 3.40                  |
| <br>Total VAT on output                       | <br>9.40              |
| <br>Total VAT as % of<br>output value         | <br>9.4% <sup>a</sup> |

<sup>a</sup> vs 10% official VAT rate

## **Treatment of Exports**

### **All Output Exported**

If the mine in question exports all of its output, then, according to the destination principle discussed in chapter 2, exports would be zero rated, and this mine would pay no value-added tax to the government. No VAT would be paid on value added and no VAT would be charged on output. The VAT paid on all inputs including transportation would be rebated.

If the accounts approach is used and invoices do not show VAT separately, then the mine must calculate VAT included on input costs so that it can apply for a rebate of input VAT. If a single rate applies to all intermediate inputs and provincial sales taxes are levied before VAT, then the calculation is an easy one. Total intermediate input cost, inclusive of VAT, is multiplied by the appropriate factor (.09091 if the VAT rate is 10 percent) and the result is VAT included in input cost. The mine would apply on standard forms for a VAT rebate.

For firms which export all output, or such a large proportion that rebates are always forthcoming, it will definitely be in their interest to have a short reporting period so that they will carry the cost of the VAT on inputs for as short a period as possible.

If the mine shown in table 8 exported all its product, no VAT would be paid on mine value added, a rebate of \$4.28 million would be obtained for the year on input VAT and output value would remain at \$84.33 million. The value added remaining with the firm would be the same as if VAT were paid according to table 8. The net position of the mine would be better than it is currently because no MST would be paid on inputs, but this improvement is the same as if the mine sells all of its output domestically. The mine has no incentive to export either more or less, since the imposition of VAT does not affect the net position of the firm.

The impact of zero rating of exports is felt as a reduction of government revenues. This means that, for the same revenue generation, the VAT rate must be higher if zero rating is used for some goods or industries. However, if zero rating is not used for exports, Canadian exporters will be penalized by being taxed both at home and in the destination country. This will put Canadian exports at a competitive disadvantage since domestic goods in the destination country will be taxed only at home. Zero rating of exports keeps our goods on an equal footing in international markets.

### Part of Output Exported, Homogeneous Product

If the credit/invoice approach is used and only one half of output is exported, then the mine would charge output VAT on the one half of sales made domestically and would subtract all input VAT paid from the amount of output VAT charged on sales. The difference between output VAT and input VAT would be remitted by the mine to the government. This is a very simple calculation and for this reason alone the federal government would be wise to adopt the credit/invoice approach for exporting firms, even if an accounts approach is adopted overall for the BTT.

With the accounts approach, on the other hand, the VAT calculation can become quite complicated when part of the output of the firm is exported and part is sold domestically. The export portion of sales would be zero rated and therefore the portion of value added generated on these exports would not be taxed. Input VAT also would be rebated on that proportion of inputs which went into export production. Allocating value added and input costs between domestic sales and exports poses no real practical problem if the one-line calculation of VAT payable, included as note (a) to table 12, is used. Unfortunately, this calculation is not intuitive; in order to understand how the exported portion of sales exempted is calculated, one would have to work through tables 12 and 13.

For example, in the case of the representative mine illustrated in table 8, if one half of output were exported then the mine would apply for a rebate of one half of input VAT. Furthermore, VAT would not be charged on the one half of output that went to exports. One half of value added would not be taxed, and therefore only \$2.076 million of VAT would be payable on value added. Domestic purchasers would pay a total of \$46.382 million for the mineral; this includes one half of the input VAT paid by the mine and VAT paid on one half of value added by the mine.<sup>33</sup> The actual calculations are shown in table 12. The VAT remitted to the government is shown as VAT payable on value added for domestic sales less the VAT rebate on inputs used for export sales. In this case, the government would owe the mine a rebate of \$65,000.

---

33. The other components of total cost are mine value added and intermediate input costs, but these are the same for exports and therefore they are not highlighted in the text.

Table 12

**A B.C. MINE WITH SOME EXPORTS - ACCOUNTS APPROACH**  
(a simplified VAT calculation, comparable to table 8)<sup>a</sup>  
(\$000s)

|                                                                             |        |        |
|-----------------------------------------------------------------------------|--------|--------|
| Gross mining revenues                                                       | 84,330 |        |
| VAT if all sales were domestic                                              | 8,433  |        |
| Total receipts                                                              |        | 92,763 |
| Less total intermediate input costs<br>(including VAT of 4,281)             |        | 47,091 |
| Mine value added including VAT payable                                      |        | 45,672 |
| VAT payable on domestic sales:                                              |        |        |
| <u>Domestic sales</u> <sup>b</sup> x .09091 <sup>c</sup> x 45,672           |        | 2,076  |
| Total sales                                                                 |        |        |
| VAT rebate on inputs used for exports:                                      |        |        |
| <u>Export sales</u> <sup>b</sup> x .09091 <sup>c</sup> x 47,091             |        | 2,140  |
| Total sales                                                                 |        |        |
| Net payment to government:                                                  |        |        |
| VAT payable on domestic sales less VAT<br>rebate on inputs used for exports |        | -65    |

<sup>a</sup> The easiest way to calculate VAT payable when the rate is 10 percent is the following:  $.09091 \times (\text{domestic sales including VAT} - \text{total intermediate input cost including VAT}) = \text{VAT payable}$ . This may be the calculation which will be allowed with the BTT. Unlike table 12, however, this one-line calculation does not provide a logical explanation in terms of VAT payable on value added.

<sup>b</sup> Both numerator and denominator must either include VAT on totals or exclude VAT. For our example, the domestic-to-exports ratio is 50:50.

<sup>c</sup> This factor corresponds to a VAT rate of 10 percent.

Table 13 shows a quicker calculation of VAT payable for the mine for the same example. If domestic sales were a different proportion of sales, then the appropriate factor to apply to total receipts less total intermediate inputs costs in the calculation of VAT payable by the mine would be domestic sales divided by total sales multiplied by .09091.

Tables 12 and 13 illustrate the case of the accounts approach. With the credit/invoice approach the calculation of VAT payable is easier, as noted above. VAT payable is equal to VAT on output less VAT on inputs. If one half of output is exported then VAT on output would exclude VAT on those exports. For our example, one half of output VAT is \$4.216 million. Using the credit/invoice approach, the firm would subtract input VAT of \$4.281 million from \$4.216 million and find that \$65,000 should be remitted by the government to the mine. In effect, this calculation identifies the amount of rebate due to the firm for VAT paid on inputs used in the production of exported output.

Table 13

**A B.C. MINE WITH SOME EXPORTS: A QUICK CALCULATION**  
 (\$000s)

|                                                                                                                                                                             |        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| Export sales (net of VAT)                                                                                                                                                   | 42,165 |
| Domestic sales (net of VAT)                                                                                                                                                 | 42,165 |
| Intermediate input costs                                                                                                                                                    | 42,810 |
| Input costs allocated to each of domestic and export                                                                                                                        | 21,405 |
| Value added for each of domestic and export                                                                                                                                 | 20,760 |
| VAT on domestic sales                                                                                                                                                       | 2,076  |
| VAT on inputs                                                                                                                                                               | 4,281  |
| 1/2 input VAT to be rebated because of exports                                                                                                                              | 2,140  |
| 1/2 input VAT passed forward to domestic customers                                                                                                                          | 2,141  |
| VAT remitted to government<br>(VAT on domestic sales value added less input VAT<br>rebate for exports or 2,076 - 2,140)                                                     | -65    |
| Cost of output to export customers<br>(1/2 value added + 1/2 input costs)                                                                                                   | 42,165 |
| Cost of output to domestic customers<br>(1/2 value added + 1/2 input costs + VAT on inputs<br>+ VAT on value added) or (domestic sales + 10% VAT<br>= 42,165 + .1 x 42,165) | 46,382 |

Part of Output Exported, Non-homogeneous Product

The examples thus far apply to the simplest case of a mine which sells a homogeneous product domestically and abroad. If the product sold abroad were different from that sold domestically, then the mine's VAT accounting would have to be more detailed, using the accounts approach. For example, sometimes the product sold abroad is tailor-made to importers' specifications: this is the case for coking coal sold to Japan. The extra processing required for exports versus domestic sales implies the use of extra capital equipment as well as inputs. This means that the inputs used solely for export preparation may have to be accounted for separately so that a full input VAT refund could be obtained, unless the quick calculation of VAT payable (note (a), table 12) is used.

With the credit/invoice approach, however, this is not a problem, because all input VAT is subtracted from output VAT in the calculation of a firm's tax liability.

### PST Considerations

The point at which PST is levied affects the net position of an exporting firm. If PST is the last tax levied, then value added remaining with the firm is reduced. This is because PST is higher when the PST is levied last, while VAT is lower; but only VAT is rebated. This problem is illustrated in table 14.

Table 14

#### AN EXAMPLE OF AN EXPORTING FIRM

---

|                           |         |
|---------------------------|---------|
| Input cost net of all tax | \$60.00 |
| Value added               | 40.00   |
| Output value              | 100.00  |
| PST rate: 10%             |         |
| VAT rate: 10%             |         |

---

.....

#### PST Applied Before VAT:

|                                    |         |        |
|------------------------------------|---------|--------|
| A. input cost                      | \$60.00 |        |
| B. PST at 10%                      | 6.00    |        |
| C. VAT at 10%                      | 6.60    |        |
| D. total input cost                |         | 72.60  |
| E. export sales value              |         | 100.00 |
| F. VAT rebate (from C)             |         | 6.60   |
| G. value added remaining with firm |         | 34.00  |

---

#### PST Applied After VAT:

|                                    |         |        |
|------------------------------------|---------|--------|
| A. input cost                      | \$60.00 |        |
| B. VAT at 10%                      | 6.00    |        |
| C. PST at 10%                      | 6.60    |        |
| D. total input cost                |         | 72.60  |
| E. export sales value              |         | 100.00 |
| F. VAT rebate (from B)             |         | 6.00   |
| G. value added remaining with firm |         | 33.40  |

---

For the mine example of table 8, value added remaining with the mine is about \$170,000 lower when the PST is levied last, when the mine exports all of its output. The reason is that, in this case, PST paid by the mine is higher. This means that the mine's costs are higher and, if output value is fixed by international markets, then the mine cannot raise prices in order to cover the increased cost.

Of course, even if PST is levied last, this mine's value added is still higher with VAT than in the current situation with the MST. In this paper's example, if all output were exported, mine value added would rise by about \$160,000 when PST is levied last, compared with about \$330,000 when VAT is levied last.

A further problem is the calculation of the input VAT rebate when PST is levied last. If the accounts approach is adopted for the business transfer tax in Canada, then the BTT or VAT paid on inputs probably will not be shown separately on invoices. However, the use of the factor which corresponds to the official VAT rate will result in an over-estimate of the input VAT paid by firms. In the table 14 example, the VAT of \$6 paid on inputs represents 8.264 percent of total input cost and not the 9.091 percent which applies when the same VAT rate is in force but PST is levied before VAT.

The easy solution to the problem, and the one likely to be adopted by the federal government, is for exporting firms to use the standard factor (e.g. .09091 for a 10-percent VAT) when applying for rebates of input VAT. This will leave the same value added remaining with the firm as if PST were levied before VAT. It is clear from this example that the exporting firms will actually receive more back as a VAT rebate than they originally paid in VAT. This means that the VAT rate will need to be higher for the same federal revenue needs, if PST is levied last.

The alternative is for firms to keep track of inputs taxed provincially, and the corresponding rates. Then the firm could apply an appropriate factor to each class of goods and calculate the input VAT accurately. This would solve the problem of inaccurate refunds, but it would surely involve a significant amount of paperwork, especially for firms where the accounting functions are not computerized. Also, the problem still remains that value added remaining with the firm is lower when PST is the last tax levied than when VAT is the last tax levied.

### **Cost of Capital Goods and Depreciation**

For the income type of VAT, it is necessary to account for depreciation, so that the tax applies only to net income. However, with a consumption type VAT, there is no need to worry about estimating depreciation and deducting it as an annual expense, because all capital goods are fully expensed in their year of purchase. The mining firm example shows this (see table 6), where the full cost of machinery, equipment and construction materials is included in the cost of purchased goods and services. In the accounts approach example, the VAT is included in the price of

the capital goods purchased, thus increasing the costs to the mining firm. Under the credit/invoice approach, the tax paid on these inputs is subtracted from tax payable on output, while under the accounts approach the firm would calculate VAT payable only on its own value added and therefore would deduct the full cost of capital assets gross of the VAT.

As noted in chapter 2, it seems most likely that Canada will introduce a consumption type of VAT. This would be advantageous for businesses, since the treatment of capital would not inhibit investment, and also because separate accounting would not be required for capital goods acquisitions and other purchases. The transition from the manufacturers' sales tax to a VAT would represent a clean break with a number of the distortions of the earlier tax, since the VAT would effectively remove all tax on these capital acquisitions.

### **Transportation Costs**

Transportation is a service which presumably will be taxable under the VAT system. It will be one of the input costs that will be deducted for the purpose of calculating value added. For exports, the VAT paid on transportation to markets will be rebatable; at the same time, VAT will be charged on the freight-inclusive value of imports.

### **Treatment of Imports**

The VAT applies to imports in the same way that it applies to domestic goods, except that VAT is applied after all transportation costs, tariffs, insurance and excise taxes have been included in the price of the import. Neither the imports nor protected domestic goods will be relatively worse off, since the VAT treats them equally. However, if the VAT is introduced in Canada as a replacement for the MST, imports may be slightly worse off, relative to their current situation. This is because the MST currently applies to imports before as much value has been added, in comparison with competing domestic goods. That bias will be lost with a VAT, since the VAT does not miss any stage of production.

### **Taxation of Inventories**

When firms calculate value added for a tax payment period, they deduct the total cost of production in the period from sales in the period. If

firms produce more than they sell, then the value added upon which VAT is levied is in a sense under-estimated. This is because the costs of inventory accumulation are included in total costs for the period, as well as costs of goods actually sold. The firm eventually pays VAT on sales of goods out of inventory so VAT cannot be avoided, but the firm does gain in the sense that VAT on costs can be deducted during inventory build-up.

For example, consider a firm which produces \$100 worth of output but sells only \$50 worth of goods. If total cost of production is \$20 it pays VAT on \$30 of value added. Value added actually produced is \$80 but the extra \$50 of value added which went into inventory will not be taxed until inventory is sold. Table 15 shows that Firms A and B pay the same total VAT regardless of when they sell their output, although the present value of VAT paid by A, which carried an inventory, is less than that paid by B, which sells all output in period one.

Table 15

VAT EFFECTS WITH AND WITHOUT INVENTORY BUILD-UP

| Firm A: With Inventory |       | Firm B: Without Inventory |       |
|------------------------|-------|---------------------------|-------|
| Period 1:              |       | Period 1:                 |       |
| Production             | \$100 | Production                | \$100 |
| Costs                  | 20    | Costs                     | 20    |
| Sales                  | 50    | Sales                     | 100   |
| Value added            | 30    | Value added               | 80    |
| VAT (10%)              | 3     | VAT (10%)                 | 8     |
| VAT on inputs          | 2     | VAT on inputs             | 2     |
| Total cost to customer | \$55  | Total cost to customer    | \$110 |
| Period 2:              |       |                           |       |
| Production             | 0     |                           |       |
| Costs                  | 0     |                           |       |
| Sales                  | 50    |                           |       |
| Value added            | 50    |                           |       |
| VAT (10%)              | 5     |                           |       |
| VAT on inputs          | 0     |                           |       |
| Total cost to customer | \$55  |                           |       |

When a VAT is introduced without other tax changes, there is no need to make adjustments for inventories that are currently held. These inventories will not have had any VAT paid on inputs but VAT will be charged upon sale. When sold, the input cost for the accounting period will imply that costs of production of goods sold out of inventory are zero and therefore value added will equal total sales value and VAT will be

paid on the full sales value. But of course, this VAT will be passed forward to customers. If the goods are exported, no VAT will be charged.

### **Adjustments for MST Paid**

If a VAT system is introduced to replace an MST, it may be necessary to make adjustments for MST paid on the production of goods in inventory. Inventory stock will have been produced using inputs which were taxable under the MST and therefore their subsequent sale may include the shifted MST cost. When the VAT is charged on sales, the VAT will also tax the implicit MST cost which is shifted. The result is a higher set of first round prices in the economy than would be the case if the MST paid on inventory stock is rebated to firms upon introduction of the VAT. Since it is often difficult for firms to estimate the amount of MST they have paid, it may be necessary for the government to establish rules for firms to follow when they apply for a rebate of the MST cost which is included in the value of inventories. However, it may be that no adjustment will be allowed, and that the inflated initial prices will be accepted as a cost of transition to VAT. Once current inventories are sold, prices would no longer include MST and they should come down. If the MST has not been shifted forward, as in the case of the representative mine example, then once the current inventories are sold, profits should rise when no MST is payable.

### **Treatment of Interest and Rent Payments**

In introducing a VAT, there are two ways in which government can treat interest and rent payments. First of all, these items can be viewed as similar to hired labour services (i.e. wages) since they represent payments to hired capital. This would mean that payments for these items are included as part of value added and taxed under VAT.

Alternatively, if the interest and rent payments made by the mine can be viewed as purchases of services, then interest and rent earnings would be treated as a part of the firm's output. This second treatment implies that value-added tax would be charged on each sale of capital services. This means that interest payments and rents would be treated like all other purchases and sales of intermediate inputs to production.<sup>34</sup>

---

34. Arnold C. Harberger, Taxation and Welfare, (Boston: Little Brown and Company, 1974).

If interest and rent payments are treated like wages and taxed as a part of the mine's value added, then the result is as shown in the third column of table 16. VAT would be calculated in the same way as in the earlier example in table 8, but value added, which is in effect left with the mine, is shown as the amount remaining after interest payments are made by the firm. In table 16 these payments equal \$300,000 and therefore the firm is left with \$41.22 million, or \$300,000 less than our original result where interest costs were assumed to be zero.

When interest and rent are treated like wages then the owners of the financial or physical capital should not be taxed when the sale is made, just as workers are not taxed on the sale of their services. The only way to ensure that interest and rent payments are free of VAT is to zero rate the output. This allows for a rebate of all VAT paid on inputs.

The practice in countries that use VAT has been to include rent payments in the VAT system, treating it as a purchase of services on which VAT must be charged. This follows the second treatment described above. If interest payments are also treated in this way then the result for the representative mine is the same as that shown in the "interest costs not exempt" column of table 16. The bottom line is the same as when interest payments are zero rated upon sale but included in the taxable value added of the mine, as shown in the final column.

If interest costs are exempt, as shown in the second column of table 16, then the result for the mine is more complicated. The explanation is given in the next section.

## **Treatment of Exempted Goods**

### Mineral Output Exempt

It is likely that zero rating will apply to the mining sector for a good part of its output, since Canada is a major minerals exporter. However, there is no reason to expect mine output sold domestically to be exempt from VAT. Exemptions are usually granted at the retail stage because they are meant to reduce the VAT burden on consumers and therefore remove some of the regressivity of the VAT system. Minerals are so far removed from the retail stage that they are unlikely candidates for exemption. Exemptions on mineral output can, in fact, be undesirable, since purchasers could end up paying higher mineral prices if mining firms successfully shifted input VAT forward. This would be true if Canada adopted a credit/invoice approach to VAT. The details of this problem were given earlier in chapter 2.

Table 16

## STANDARD EXAMPLE FROM TABLE 6 ADJUSTED TO INCLUDE INTEREST COSTS, ACCOUNTS APPROACH (\$000s)

|                                                             | Interest<br>Costs Not<br>Exempt | Interest<br>Costs<br>Exempt | Interest<br>Costs Taxed<br>as Part of<br>Mine's Value<br>Added |
|-------------------------------------------------------------|---------------------------------|-----------------------------|----------------------------------------------------------------|
| Gross mining revenues                                       | 84,330                          | 84,330                      | 84,330                                                         |
| Intermediate input costs    42,810                          |                                 |                             |                                                                |
| Interest costs                                              |                                 |                             |                                                                |
| if not exempted            300                              |                                 |                             |                                                                |
| if exempted                310                              |                                 |                             |                                                                |
| Total input costs                                           | 43,110 <sup>a</sup>             | 43,120 <sup>b</sup>         | 42,810                                                         |
| Value added                                                 | 41,220                          | 41,210                      | 41,520                                                         |
| VAT at 10%                                                  | 4,122                           | 4,121                       | 4,152                                                          |
| .....                                                       |                                 |                             |                                                                |
| Net Position of this mine after VAT                         |                                 |                             |                                                                |
| Total cost of mine output to<br>customers                   | 92,763                          | 92,763                      | 92,763                                                         |
| Less VAT paid on inputs                                     | 4,311                           | 4,281 <sup>c</sup>          | 4,281                                                          |
| Less VAT paid on mine value added                           | 4,122                           | 4,121                       | 4,152                                                          |
| Less total input costs including<br>interest costs          | 43,110                          | 43,120                      | 43,110 <sup>a</sup>                                            |
| Value added remaining with the mine<br>after interest costs | 41,220                          | 41,241                      | 41,220                                                         |
| Benefit to mine of exempting<br>interest costs              |                                 | +21                         |                                                                |

<sup>a</sup> Includes interest cost of \$300,000.

<sup>b</sup> Includes interest costs of \$310,000. \$10,000 is the amount of financial sector input VAT which is assumed to be passed forward to the mine.

<sup>c</sup> Total input costs given above equal \$43.12 million but this includes the exempted interest costs which are equal to \$310,000. Input VAT was paid on the total less interest costs or \$42.81 million.

### Interest Costs Exempt

If Canada follows the lead of many other countries that use VAT, financial institutions will be exempted from VAT. This has been done elsewhere because it has been assumed that it is too difficult to use the credit/invoice method of calculating VAT in the case of financial institutions. This means that banks, for example, would not charge VAT on their output of financial services and they would not pay VAT on value added. They would, however, pay VAT on their inputs but they could not receive a rebate for it. If it is assumed that the banks pass forward all costs of production, then it can be predicted that service costs would rise to cover any VAT paid on inputs. This would increase interest charges to borrowers; the borrowers, however, could not deduct the VAT that was responsible for increasing the interest charge, since the financial service of loaning money would be exempt.

### Credit/Invoice Approach

If it is assumed that interest costs rise by \$10,000 because of the bank's input VAT, then the mining firm's input costs could rise by \$310,000 but input VAT would not rise at all above the amount shown originally in table 10, using the credit/invoice approach when interest costs are exempt. VAT paid by the firm is \$4.152 million, as calculated earlier, while value added remaining with the firm is now reduced by the \$310,000 interest cost: i.e. \$41.21 million. This is \$10,000 less than the result when the interest costs are not exempt but instead are taxed under the VAT system.

The important assumption upon which this result depends is that the mine, as price taker, cannot pass on to consumers the extra \$10,000 in input VAT that the banks shift on to the mine. This treatment is in contrast to the one shown earlier in chapter 2, where it was assumed that the firm would shift forward any cost increases due to buried VAT. If the mine were able to, it too would shift forward this extra cost in the form of higher prices. Firms with a greater proportion of debt financing would show greater price increases and therefore the fact that banking services were exempt would cause capricious changes in relative prices.

### Accounts Approach

Under the accounts approach, the opposite result occurs when interest costs are exempt. The mine enjoys an increase in its value added and

firms which rely more on debt finance will enjoy a greater rise in their value added.

Table 16 shows the necessary changes when interest costs are incorporated. In the "interest costs exempt" column, input costs for the mine rise by \$310,000 if banks pass forward input VAT. Assuming constant prices and output for the mine, value added net of VAT falls by \$10,000 below the case where interest costs are not exempt.<sup>35</sup> A drop in value added of \$10,000 results in a reduction in VAT payable by \$1,000 when the VAT rate is 10 percent. VAT paid on inputs is \$30,000 less when interest charges are exempt. The final result is that value added remaining with the firm is \$21,000 higher if interest costs are exempt.

#### Interest Costs Not Exempt

If interest costs are not exempt, then the accounts approach yields the same results as the credit/invoice approach. If banks are not exempt, then the interest cost of borrowing would be included, like any other intermediate input cost which was subject to VAT. Value added remaining with the firm in our example would fall by the \$300,000 interest cost; this occurs because we are now including a cost that was previously ignored, and not because of the VAT system itself.

#### Conclusion: Treatment of Interest Costs

Exempting interest costs when the credit/invoice approach is used reduces the mine's final value added by \$10,000. Exempting interest costs when the accounts approach is used raises the mine's value added by \$21,000; value added in this case does not rise by \$31,000 because the bank's input VAT of \$10,000 is shifted forward to the mine. In conclusion then, exemption of interest costs in the credit/invoice approach causes a bias against debt-financed firms; this same exemption creates a bias in favour of debt-financed firms if the accounts approach is used.

In order to remove the bias caused by interest exemptions, the government has only two possible options. First, financial institutions could

35. In this example it is assumed that mine value added falls by the amount of VAT shifted forward by the exempted financial institutions. This is realistic, since the mine has no way of knowing how much of its interest cost is in fact input VAT. It calculates its value added based on the assumption that all of the interest cost is intermediate input cost. This treatment is in contrast to the example of an ideal situation, given earlier in table 4, where each firm's value added is unaffected by the input VAT shifted forward by exempted suppliers.

be included in the VAT system. This option carries with it the costs for government of solving the problems associated with taxing financial institutions, as well as the costs for the financial institutions of complying with VAT. The second option is the zero rating of financial institutions combined with the taxation of interest costs as a part of each purchasing firm's value added. This option seems the most likely, because it provides a simple way of indirectly taxing the value added of financial institutions.

### **Government Goods and Services**

Government goods and services will probably be treated like other taxable output. This would maintain the relative price ratio between private and publicly-provided goods and services once the VAT is added to prices. Inclusion of public goods would prevent their obtaining a relative price advantage in comparison with private goods. For this reason the representative mine example includes VAT on recording fees, assessment fees and other costs of government services in the total amount of VAT paid on inputs. Any sales made by the mine to governments would also be taxable.

### **Subsidies**

Government subsidies to businesses can be viewed as revenue generated by the businesses. The service provided by the firm in return for the payment is not obvious, but could be considered to be the simple service of staying in business and therefore not eliminating jobs. This is the proposed treatment of subsidies for New Zealand's General Services Tax, which is a tax on value added.<sup>36</sup> It seems to provide consistent treatment of subsidies, when taxes such as the B.C. water tax are treated as a taxable service input cost for the firm.

---

36. New Zealand, Department of Finance, Proposals for the Administration of the Goods and Services Tax, New Zealand, March 1985, p. 34, paragraph 101.

### **Treatment of Leases**

The mineral lease purchased by a firm gives the mine the right to extract and sell the mineral resource that is covered by the lease. The lease is typically let by a province as owner of the resource, unless the property is privately held. If it is decided that government sales will be taxed, then the sale of mineral leases would be taxed under VAT. The mine would deduct the full cost of the lease for the value-added calculation in the year in which the purchase is made. This is the same way that capital equipment expenditures are treated under a consumption type VAT.

Mineral leases which were purchased before the introduction of a VAT system would include no VAT in their purchase price, and therefore there would be no need to make adjustments because of these earlier purchases.

### **Royalties, Resource Taxes and Income Taxes**

Mine income which is diverted in the form of taxes paid by the mine on the income generated by the mine are included in the value added which is taxed by the VAT. If these taxes were excluded from the VAT tax base, then the VAT would cease to be a tax on value added; firms would be treated differently according to their earnings position. The amount of VAT shifted forward would also be different for different goods, and even for the same product produced by different firms. The resulting distortions in relative prices of final products would reduce economic efficiency.

### **Water Taxes**

B.C. Hydro pays a water tax or water rental to the B.C. government. This tax is like a royalty on the water that B.C. Hydro uses to generate electricity. B.C. Hydro passes this tax on to consumers as part of their payment for electricity. If the federal government views this as a direct charge for a particular service, then the water tax presumably would be taxed like any other service under the VAT, as shown in the basic calculation of VAT for the hypothetical mine in table 8. In contrast, the corporate income tax would not be treated as a taxable input. Tax revenue generated by the corporate income tax is used for providing general services over the whole economy; unlike the water tax; it cannot be viewed as a payment for a specific service. Only specific charges of the water tax sort are likely to be candidates for VAT.

It is of no consequence to the mine whether the water rental is taxed under VAT as an input, or taxed as a part of its value added, because the value added remaining with the firm is the same with either treatment. Similarly, the amount of VAT passed on to consumers is the same in either case.

#### **VAT as a Deduction for Income Tax Purposes**

Questions may arise about whether the VAT should be deductible in the calculation of net earnings for income tax purposes. There might seem to be some precedent for this: for example, in the Alberta deduction for oil and gas royalties in the calculation of provincial corporate income taxes. This provision was introduced in order to prevent double taxation of income. However, since the VAT is fully shifted forward to consumers in the form of higher, tax-inclusive prices, there seems to be no rationale for such a provision in a VAT system. If, instead, the VAT reduced net earnings on items sold and yet was not deductible for income tax purposes, then there would be a problem of double taxation of income. In theory, the forward shifting of the tax removes the problem.

There is, however, an accounting reason for allowing a deduction for the VAT paid by a firm: if the sales revenue shown on the firm's earnings statement includes VAT charged on sales, then the VAT paid by the firm must be allowed as a deduction. Otherwise, the firm will pay more income tax after the VAT system is introduced, even though its net income does not rise. A very simple example illustrates this. Assuming that a firm has sales of \$100 and costs of \$50 before VAT, it will pay income tax on \$50 of net income. After a 10-percent VAT, sales equal \$110 and costs equal \$55. The difference of \$55 between revenue and cost is not net income; it is net income of \$50 plus VAT on value added of \$5. Deduction of the \$5 VAT leaves the firm in the same taxable position as before VAT.

If, on the other hand, all sales and costs are shown net of VAT on earnings statements, then VAT should not qualify as a deduction. Since the business transfer tax is to be based on an accounting approach for calculations, and therefore invoices will not necessarily show VAT separately, costs on the earnings statements will include VAT. It will be consistent for sales to include VAT, and therefore VAT paid on value added by firms must be allowed as a deduction; otherwise, there will be taxation of revenue which is not earned income.

### **Profitable Versus Loss-Position Firms**

As with the manufacturers' sales tax, the VAT applies whether or not firms are generating positive earnings. Sales taxes in general are unrelated to net income and therefore they can be more reliable as a source of government revenues than income taxes, which are linked to profitability. Also, successful firms are not penalized for their success, as they can be with the corporation income tax, and therefore disincentives are not created. VAT places no burden on any exporters. It is expected that any increased input costs resulting from a VAT will be recoverable through higher sales prices, and therefore, the extra tax cost will not place a burden on firms which are in a loss position. However, the cost of compliance itself may impose a significant burden on small, or unprofitable firms.

### **Land**

Since land is not "used up" in the normal sense of an intermediate input to production, it is not likely that it will be taxed when a sale is made and therefore it would not be included as a cost when a firm makes its value-added calculation.

### **Sales of Assets**

If the mine were to sell buildings, machinery, or other capital assets, it would charge VAT on the sale. The purchaser would in turn deduct this input VAT when calculating its VAT payable.

### **VAT and Owned Subsidiaries**

VAT systems are set up in such a way that firms must register with the relevant federal office to gain status as a taxable entity. Any firm which must charge tax and which will want to deduct VAT paid on inputs will need to register. Firms which sell zero-rated output such as exports will need to register so that they can recoup VAT paid on inputs, even though they neither charge VAT on output nor pay VAT on value added. Exempt firms need not register, since they charge no VAT on output and pay no VAT on value added; however, they cannot deduct VAT paid on inputs. If a fully-owned subsidiary already keeps separate books and pays income taxes on the basis of its own tax accounting of

income, then it may make sense for it to be registered separately from the parent firm. This implies that purchases and sales made by the parent and subsidiary to one another become taxable transactions. For example, if the parent's legal staff works for the subsidiary, then the parent will charge VAT on the sale; the subsidiary can deduct this VAT along with its other input VAT when its own VAT calculation is made.

The general rule is that VAT must be charged when a sale is made between one taxable entity and another entity. This automatically includes sales between owned but separately taxed entities. This is in contrast to the treatment of inhouse services. The lawyer mentioned above sells his legal services to the parent firm, but if he is an employee of the firm then he is not a taxable entity. As such, he charges no VAT. However, if the parent firm buys legal services from a separate law firm which is a taxable entity on its own, then the law firm will charge VAT on its sales of services.

The treatment of sales between owned subsidiaries under VAT should not be difficult to include in the accounting of the parent and subsidiary, since it is probably the case that sales of services are costed and accounted for in this way already. Even though it may be simple for all subsidiaries to register separately, the government may leave this choice up to the firm itself and let it decide how best to report for VAT purposes. If all subsidiaries or branches register as one entity for VAT purposes, then the exchange of internal services or goods within the firm need not have VAT added. Only the sales and purchases between the firm and separately registered firms would include VAT.

Whether or not a firm is foreign-owned or domestically owned is irrelevant for purposes of VAT. It is likely that all firms operating in Canada will need to be registered for VAT purposes.

### **Costs of Tax Compliance**

On the basis of the experience of countries where VAT has already been introduced, it can be expected that there will be compliance costs borne by firms if a VAT is introduced in Canada. These will include the costs of accounting or record-keeping, as well as the opportunity costs associated with rebates which are pending. For small firms without automated accounting procedures, the paperwork costs may be a large burden. Exporting firms could suffer significant losses if the return period is long, causing input VAT rebates to be slow in coming. The importance of these issues can be discussed succinctly only when the proposed details for a VAT in Canada are disclosed. For example, the rebate of input VAT for exporters may somehow be made automatic upon purchase of inputs.

## 5. SUMMARY OF CONCLUSIONS

In summary, the proposed BTT would be preferable to the current federal MST for the Canadian economy in general, basically because it would eliminate distortions in production and consumption decisions that are inherent in the present system. A major objection to the new tax has been that it will be an administrative nightmare; however, the simplified accounts approach to the VAT calculation illustrated in table 9 indicates that this should not be a serious concern. As long as the BTT system has only one rate, the new system should cause fewer administration problems than the MST.

The Canadian mining sector in particular will benefit from a switch from MST to a VAT. Although the analysis here is based on a number of assumptions and on one representative mine, the qualitative conclusions can be extended to Canadian mines in general. The primary benefit associated with the introduction of the VAT will be the elimination of the hidden MST costs that are currently included in mining output values. Where Canadian producers are price takers, this cost reduction will translate into increased profits and probably output expansion as well. Where Canadian firms have some influence over world prices, they can choose to increase returns and therefore profitability, or reduce prices up to the amount of the eliminated MST, and improve their competitive position. Furthermore, the VAT will be removed on all exports and therefore it will not hurt the competitive position of Canadian mining firms in export markets vis-a-vis other producers.

The analysis sheds light on advantages to the mining industry of several of the options open to the federal government in designing the BTT, particularly with respect to treatment of exporters and interest costs:

- in order to simplify calculations for exporters which also sell domestically, the one-line calculation of VAT payable shown in note (a) to table 12 should be used. If this approach is not allowed, then the credit/invoice approach should be allowed for VAT calculations, even though the BTT may, in general, be an accounts approach VAT;
- exporting mining firms would be better off if provincial sales taxes were levied before VAT, rather than after. Since it seems likely that PST will continue to be levied last, because the provinces benefit most from this approach, exporters would benefit if VAT rebates could be calculated as if provincial sales taxes were levied after VAT;

- exporting firms would benefit from automatic rebate of VAT at the time input costs are paid; or, at least, from very short reporting periods which would reduce the time lag before rebates on inputs are received;
- if interest charges of banks and other financial institutions are exempt under the proposed BTT, firms with debt would enjoy a greater increase in value added, as long as the accounts approach is, in fact, adopted for the BTT. However, zero rating of financial institutions is the likely federal choice and this will, nevertheless, result in gains for the mining sector;
- VAT paid by firms must be allowed as a deduction for corporate income tax calculations if gross revenues and costs both include VAT.

On balance, the mining industry should welcome a switch from manufacturers' sales taxation to value-added taxation. The extent of the resulting benefits will not be fully known until the exact details of the BTT have been revealed, including the rate of taxation, the use of exemptions and zero rating, and methods of calculation, as well as the resulting costs of compliance. Overall, however, it appears that mining firms can expect net benefits from the introduction of VAT.

## REFERENCES

- Bhatia, Kul B., "Value-Added Tax and the Theory of Tax Incidence", Journal of Public Economics 19, 1982, pp. 203-223.
- Boadway, Robin and Kitchen, Harry, Canadian Tax Policy, Canadian Tax Paper No. 63, (Toronto: Canadian Tax Foundation, 1980).
- Canada, Department of Finance, Securing Economic Renewal, "The Budget Speech" and "Budget Papers" (Ottawa: Department of Finance, February 1986).
- Canada, Department of Finance, "Why A VAT?", Ottawa, 1985, mimeo.
- Canada, Report of the Federal Sales Tax Review Committee, (Ottawa: Supply and Services, 1983).
- Canada, Report of the Royal Commission on Taxation, vol. V, (Ottawa: The Queen's Printer, 1966).
- CCH Canadian Limited, Sales Tax Guide Canada, 33rd Edition, (Toronto: CCH Canadian Limited, 1986).
- Crossen, Sijbren, "Sales Tax Coordination", in Proceedings of the Thirty-Seventh Tax Conference (1985), Toronto: Canadian Tax Foundation, 1986.
- Crossen, S., "What Kind of Sales Tax? - Critique of a Government Paper", Canadian Tax Journal 23, 1975, pp. 505-519.
- Davies, James B., "Manufacturers' Sales Tax, Value-Added Tax, and Effective Tax Incidence", in Proceedings of the Thirty-Seventh Tax Conference (1985), Toronto: Canadian Tax Foundation, 1986.
- Due, John F., "The Choice Between a Value-Added Tax, and a Retail Sales Tax", in Proceedings of the Thirty-Seventh Tax Conference (1985), Toronto: Canadian Tax Foundation, 1986.
- Due, John F., "The Dilemma of Canadian Federal Sales Tax Reform", in Report of Proceedings of the Twenty-Seventh Tax Conference (1975), Toronto: Canadian Tax Foundation, 1976, pp. 188-206.
- Gillis, Malcolm, "Financial and Housing Services and the Value-Added Tax", in Proceedings of the Thirty-Seventh Tax Conference (1985), Toronto: Canadian Tax Foundation, 1986.
- Gillis, Malcolm, "Federal Sales Taxation: A Survey of Six Decades of Experience, Critiques and Reform Proposals", Canadian Tax Journal 33, 1, 1985, pp. 68-98.
- Gillis, Malcolm, "Excising Excises: Federal Sales Tax Reform in Canada", Proceedings of the Thirty-Sixth Tax Conference (1984), Toronto: Canadian Tax Foundation, 1985, pp. 460-524.

- Harberger, Arnold C., Taxation and Welfare, (Boston: Little Brown and Company, 1974).
- IMF, Staff Study, "Is the Introduction of a Value-Added Tax Inflationary", as reported in United States, Department of the Treasury, November 1984.
- Kuo, Chun-Yan, McGirr, Thomas C. and Poddar, Satya N., "On Measuring the Effective Federal and Provincial Sales Tax Rates in Canada", Ottawa: Department of Finance, 1985, mimeo.
- Lindholm, Richard W., The Economics of VAT, (Lexington, Massachusetts: Lexington Books, 1980).
- Mining Association of British Columbia, "The British Columbia Mining Industry in 1984", Vancouver, 1985.
- Musgrave, Richard A. and Musgrave, Peggy B., Public Finance in Theory and Practice, (New York: McGraw-Hill, 1984).
- New Zealand, Department of Finance, Proposals for the Administration of the Goods and Services Tax, New Zealand, March 1985.
- Throop Smith, Dan, Webber, James B., and Cerf, Carol M., What You Should Know About the Value-Added Tax, (Illinois: Dow Jones-Irwin Inc., 1973).
- Treddenick, J.M.B. and Boadway, Robin W., "The General Equilibrium Effects of Commodity Taxes in an Economy With Inter-Industry Flows", Public Finance Quarterly 5 (3), 1977.
- United States, Department of the Treasury, Tax Reform for Fairness, Simplicity and Economic Growth, vol. 3, "Value Added Tax", Washington, D.C.: Office of the Secretary, November 1984.
- United States, General Accounting Office, "The Value-Added Tax - What Else Should We Know About It", Washington, D.C., GAO, March 1981.
- Weyman, David C., "Pros and Cons of the Value-Added Tax", talk on federal sales tax reform in Canada to the Eastern Regional Association of Sales Tax Administrators, Baltimore, Maryland; Ottawa: Department of Finance, August 1985, mimeo.

## THE AUTHOR

Brenda Dyack studied economics at the University of Guelph, where she received BA and MA degrees. She has worked as an economic analyst or consultant for a number of government agencies and departments, including the City of Oshawa, the Library of Parliament, Energy, Mines and Resources Canada, the Government of British Columbia, and the Economic Council of Canada. Ms. Dyack is self-employed as a consulting economist, with special interest in resource economics and management, and also lectures in economic theory at the University of Alberta.

## THE CENTRE FOR RESOURCE STUDIES

The Centre for Resource Studies (CRS) was established in 1973, under the sponsorship of Queen's University, the federal Department of Energy, Mines and Resources, and The Mining Association of Canada, to carry out a program of research and publication on mineral policy issues.

The Centre provides opportunities for multidisciplinary research in resource studies at Canadian universities, furnishes reliable information on matters related to mineral resource policy, and promotes closer liaison between government, industry and other concerned groups. The research program is carried out both at the Centre and by means of contracts with qualified investigators, usually at Canadian universities. Small exploratory studies are also funded, through a system of grants-in-aid of research. CRS Seminars involve representatives from governments, industry, universities, labour, and other interested groups in working sessions on issues of current concern. Through this program of research and seminars, and the resulting publications, the Centre contributes to informed discussions and a better understanding of significant issues.

The Centre is governed by a board of directors which establishes general policy and priorities for research. The board has sixteen members, appointed by Queen's University, The Mining Association of Canada, and the federal government. Guidance on the research program, together with discussion of policy issues and other matters, is provided by the Advisory Council. This body comprises all researchers associated with the Centre, together with members appointed from such groups as governments, industry, labour, and other interests. A Research Advisory Committee aids in the development of projects and the selection of research proposals. The executive director and staff are responsible for the work of the Centre within this framework.

Most of the funding for the Centre's activities is provided by two of the sponsors, EMR and MAC. In addition, the Centre accepts contracts from other organizations interested in mineral policy research.

The Centre welcomes comments on its publications, proposals for research projects or for publication, or enquiries about any aspect of its work. For further information, contact:

Centre for Resource Studies  
Queen's University  
Kingston, Ontario, Canada K7L 3N6  
(613) 545-2553

## CRS PUBLICATIONS

### Monographs and Collections

Conflict and its Resolution in the Administration of Mineral Resources in Canada, by R.M. Burns; 62 pages, 11 tables. Published 1976.

The Impact of the Mining Industries on the Canadian Economy, by R.W. Bowdway and J.M. Treddenick; 116 pages, 15 tables. Published 1977.

The Transportation Impact of the Canadian Mining Industry, by A.I. Wallace; 154 pages, 17 tables. Published 1977.

Human Resources in Canadian Mining: A Preliminary Analysis, by J.A. MacMillan, G.S. Gislason, and S. Lyon; 174 pages, 48 tables. Published 1977.

Health and Safety in the Canadian Mining Industry, by G.W. Gibbs and P. Pintus; 248 pages, 58 tables. Published 1978.

The Canadian Nonferrous Metals Industry: An Industrial Organization Study, by E. Urquhart; 158 pages, 18 tables. Published 1978.

Economic Impacts and Linkages of the Canadian Mining Industry, by P.E. Nickel et al.; 140 pages, 31 tables. Published 1978.

Environmental Impact of Mining in Canada, by E.A. Ripley et al.; 274 pages, 45 tables. Published 1978, reprinted 1982.

Effects of Taxation on Base Metal Mining in Canada, by B.W. Mackenzie and M.L. Bilodeau; 188 pages, 29 tables. Published 1979.

Gold: The World Industry and Canadian Corporate Strategy, by E. Cousineau and P.R. Richardson; 192 pages, 32 tables. Published 1980.

The Impact of Policy Change on Decisions in the Mineral Industry: The Case of Exploration in Manitoba, 1969-77, by B.E. Owen and W.J. Kops; 116 pages, 8 tables. Published 1980.

The Role of Mineral Taxation in Industry/Government Conflict: The Case of the Saskatchewan Potash Reserve Tax, by David L. Anderson; 135 pages, 41 tables, 2 illustrations. Published 1981.

Profitability in the Canadian Mineral Industry, by Charles H. Pye; 178 pages, 42 tables, 12 illustrations. Published 1981.

Foreign Investment Control in the Canadian Mineral Sector: Lessons from the Australian Experience, by David L. Anderson; 180 pages, 22 tables. Published 1983.

Financing Canadian Mining in the Eighties: Strategies for Action, edited by David Yudelman; with papers by B. Bradley, A. Dorland, J. Erola, P. Gillin, P. Glenshaw, S. Greenwald, H. Kalyon, P. MacCulloch, H. Mackenzie, K. Murphy, A. Powis, R. Sultan, and D. Yudelman; 240 pages. Published 1984.

National Resources and International Bargaining Power: Canada's Mineral Policy Options, by Patrick J. Carraga; 204 pages, 23 tables. Published 1984.

Canadian Mineral Policy Past and Present: The Ambiguous Legacy, by David Yudelman; 188 pages, 9 tables. Published 1985.

### Proceedings

No. 1 Rate-of-Return Taxation of Minerals, edited by N.D. Olewiler and P.R. Richardson, with papers by B.W. Mackenzie and M.L. Bilodeau, P.M.T. White, N.D. Olewiler, J.T. Cawley, and E.P. Gush; 109 pages. Published 1978.

No. 2 International Competition and the Canadian Mineral Industries, edited by C.H. Pye and M.J. Wojciechowski, with papers by H.C. Armstrong, H.T. Fargay, C.G. Miller, N.D. Olewiler and P.R. Richardson, D. Perlestein, and K.C. Hendrick; 109 pages. Published 1978.

No. 3 Current Concerns in Mineral Policy, edited by B.W. Mackenzie and C.E. McMurray, with papers by C.R. Archibald, W.J. Barbour, D.B. Brooks, J.S. Dowsett, J.N. Fleming, and G.A. Jewett; 75 pages. Published 1978.

No. 4 Canada's Mineral Trade: Implications for the Balance of Payments and Economic Development, edited by M.J. Wojciechowski, with papers by H.W. Wilkinson, D.J. McCulla, J.G. MacKinnon, A.G. Balogh, and W.G. Chambers and J.S. Reid; 113 pages. Published 1978.

No. 5 Employee Relations Initiatives in Canadian Mining, edited by M.J. Wojciechowski, with papers by W.J. Bennett, F.R. Nogas and J.P. Fulcher, W.F. Clarke, S.B. Jones, T.F. Cawsey and P.R. Richardson, and P. Warran; 85 pages. Published 1979.

No. 6 Junior Mining in Canada: The Problem of Investment and Securing Fair Returns, edited by M.J. Wojciechowski, with papers by A.J. Freyman, B.A. Kalyon, J.D. Mason, D.W. Scrim, E.H. Neave and P.R. Richardson, and E.G. Thompson; 101 pages. Published 1979.

No. 7 The Future for Junior Mining in Canada, edited by M.J. Wojciechowski, with papers by Hon. J.A.C. Auld, J.L.C. Lyndon, N.B. Keevil Jr., D.G.C. Menzel, H.T. Fargay, A.J. Freyman, Hon. R. Hnatyshyn, J.C. Baillie, D.W. Scrim, J.P. Bunting, E.H. Neave and P.R. Richardson, L.A. English, N. St-B Harrison, R.H. Grasley, and Hon. F. Drou; 125 pages. Published 1979.

No. 8 Mining-Linked Diversification of the Sudbury Basin Economy, edited by M.J. Wojciechowski, with papers by D.C. Frith, J.P. Reny, A.I. Wallace, J.H. Holtby and L.C. Kitchener; 53 pages. Published 1980.

No. 9 The Changing Structure of the Canadian Mineral Industry, edited by M.J. Wojciechowski, with papers by I.A. Stewart, R.P. Mikesell, R. Simeon, R. Keyes and J.M. MacLeod; 105 pages. Published 1980.

No. 10 Northern Mining in the 80s, edited by M.J. Wojciechowski, with papers by Hon. G. Braden, R.J. Cathro, J. MacKinnon, J. Smith, R.W. Stephenson, B.E. Novak, E.N. Doyle, J.R. Witty, J.E. Marshall, A.G. Gordon, J. McCormack, H.B. Hicks, J. Zigarlick, T. Shearcroft, W. Kupsch, J. Stabler, and Hon. J. Erola; 110 pages. Published 1980.

No. 11 Skilled Manpower Shortages in the 1980s: Towards a Cooperative Solution, edited by M.J. Wojciechowski, with papers by R.J. Gray, J.S. Reid, W.H. Digby, J.B. Hopkinson, A. Knoll, O. Tremblay, G. Betcherman, P.E. Womersley, M.J. Alton, V.C. Allman, C. Stairs, E.J. Weiss, and W.E. McBride; 116 pages. Published 1981.

No. 12 Acid Rain Controls and the Economics of the Canadian Nonferrous Mineral Industry, edited by M.J. Wojciechowski, with papers by J. Gerin, W.G. Deeks, P.R. Clarke, J.B. Hyne, H.T. Fargey, B.W. Mackenzie, and E.J. Ward; 90 pages. Published 1982.

No. 13 Mineral Policy Formulation: The Role of Scientific and Technical Knowledge, edited by M.J. Wojciechowski, with papers by G.A. Jewett, H.D. Drechsler, P.G. Halkett, D.E. Bond, D.C. Findlay, W.G. Jeffery, L.G. Bonar, D.W. Davis, and J. Zwartendyk; 135 pages. Published 1982.

No. 14 Mining Communities: Hard Lessons for the Future, edited by M.J. Wojciechowski, with papers by I. Haugh, R.P. Douglas, R. MacDonald, D. Brown, R.D. Glass, J. Lazarovich, W. Mulvihill, D. DePape, G. Paget, B. Walisser, and R. Roberts; 211 pages. Published 1984.

No. 15 Native Participation in Mineral Development Activities, edited by M.J. Wojciechowski, with papers by A. Clark and M. Lalonde, K.A. Graham, B.W. Mackenzie, C.D. Hunt, J.L. Blais, F.R. Joubin, and E. Laliberte; 105 pages. Published 1984.

No. 16 Mining Productivity, edited by M.J. Wojciechowski, with papers by P.R. Richardson, K. Stollery, H. Martin, B.W. Mackenzie, C.G. Miller, W. James, P. LePage, E. Kossatz and W. Curlook, and K. Whitham; 187 pages. Published 1985.

No. 17 Canadian Mining Taxation, edited by M.J. Wojciechowski, with papers by G. Langlois, D. Williams, T. Enemark, P. Halkett, R. Albert, K. Service, K. O'Brien, R. Roadway and J. Mintz; 146 pages. Published 1985.

No. 18 Structural Changes in the World Mineral Industry: Implications for Canada, edited by M.J. Wojciechowski, with papers by P. Crowson, W.G. Deeks, G. Jewett, G. Peeling and W. Chambers, S. Hunt and G. Haclin, J. Davies, D. Karvonen, G. Denis, D. Daly, D. Haglund, I. Bennett, G. Mahoney, K. Huck; 210 pages. Published 1986.

No. 19 Technology Policies in the Canadian Mineral Industry, edited by M.J. Wojciechowski, with papers by R. Woodbridge, M.J. Wojciechowski, F. Pickard, D. Bevelander, J. Hood, W.G. Jeffery and J. Kuryulowicz, P. Richardson, J. Schade, W. Curlook, M. Sayer, G. Hatch, D. Hutchison, and A. Molinari; 185 pages. Published 1986.

#### **Working Papers**

No. 3 Provincial Mineral Policies: Newfoundland, 1949-75, by M.J. Prince; 67 pages, 7 tables. Published 1977.

No. 6 Provincial Mineral Policies: Saskatchewan, 1945-75, by R.C. Murray; 64 pages. Published 1978.

No. 8 Federal Mineral Policies: 1945-75, by M.J. Wojciechowski; 85 pages, 21 tables. Published 1979.

No. 9 Trends in Canada's Mineral Trade, by B.W. Wilkinson; 63 pages, 27 tables. Published 1978.

No. 10 Canada as a World Zinc Producer: Prospects to 1980, by N.D. Olewiler, P.R. Richardson, and L. Rumble; 22 pages, 12 tables. Published 1978.

No. 11 A Survey of Resources and a Production Cycle for the Nonferrous Metals, by C. Lafkas and J.G. Paterson; 34 pages, 9 tables. Published 1978.

No. 12 Solar Energy and the Canadian Mining Sector: A Demand Forecast, by J.S. Shewchun and D.B. Curtis; 45 pages, 14 tables. Published 1978.

No. 13 Cerro Colorado: A Case Study of the Role of Canadian Crown Corporations in Foreign Mineral Development, by C.G. Miller, N.D. Olewiler, and P.R. Richardson; 44 pages, 5 tables. Published 1979.

No. 14 The Administration of Mineral Exploration in the Yukon and Northwest Territories, by K.A. Graham, R.G. McEachern and C.G. Miller; 42 pages. Published 1979.

No. 15 Public Policy Aspects of Information Exchange in Canadian Mineral Exploration, by D.O. Downing and B.W. Mackenzie; 52 pages. Published 1979.

No. 16 Canada's Competitive Position in Copper and Zinc Markets, by B.W. Mackenzie; 41 pages, 21 tables. Published 1979.

No. 17 Constitutional Change and the Mineral Industry in Canada, by Wendy MacDonald; 66 pages. Published 1979.

No. 18 An Economic Analysis of the Canadian Taxation of an Integrated Mining Company, by Jean-Thomas Bernard; 112 pages. Published 1980.

No. 19 Looking for the Improbable Needle in a Haystack: The Economics of Base Metal Exploration in Canada, by B.W. Mackenzie; 48 pages. Published 1980.

No. 20 The Market Price of Risk in the Canadian Mining Industry, by H.F. Campbell; 29 pages. Published 1980.

No. 21 Public Affairs and the Minerals Industry: Junior Mining; Northern Development; Loans for Foreign Mines; A Public Relations Strategy, by C.G. Miller; 42 pages. Published 1980.

No. 22 Newfoundland Mining Industry: Present Status and Potential for Expansion, by N.D. Olewiler and C.H. Pye; 208 pages, 83 tables. Published 1980.

No. 23 Effects of Water Pollution Control Costs on Base Metal Mining in Canada, by N.A. Papanicolaou and B.W. Mackenzie; 74 pages. Published 1981.

No. 24 The Costs of Uncertainty: Regulating Health and Safety in the Canadian Uranium Industry, by I. Robinson; 74 pages, 3 illustrations. Published 1982.

No. 25 Economic Guidelines for Small Mineral Deposits/Directives économiques relatives aux petits gisements, by B.W. Mackenzie and M.L. Bilodeau; 66 pages, 12 tables, 14 illustrations. Published 1982.

No. 26 Effects of Public Policy on Investment Demand: The Case of Taxation in Canadian Base Metal Mining, by B.W. Mackenzie and C.H. Pye; 58 pages, 17 tables, 11 illustrations. Published 1982.

No. 27 The Prospects for Canadian Uranium, by S. Salaff; 50 pages, 9 tables. Published 1983.

No. 28 Economic Mineral Exploration Targets, by B.W. Mackenzie; 72 pages, 3 tables, 19 illustrations. Published 1984.

No. 29 Dominant Government Firms in an Oligopolistic Industry: The Case of Saskatchewan Potash, by F. Flatters and N. Olewiler; 43 pages, 3 tables. Published 1984.

No. 30 Canadian Mineral Policy Formulation: A Case Study of the Adversarial Process, by D. Yudelman; 83 pages. Published 1984.

No. 31 Federal Policy and the Role of Public Enterprise in the Mining Sector, by M.J. Prince and G.B. Doern; 52 pages, 2 tables. Published 1984.

No. 32 Productivity and Price: The Case of Gold Mining in Ontario, by A.G. Green; 54 pages, 5 tables, 2 illustrations. Published 1984.

No. 33 The Origins of Public Enterprise in the Canadian Mineral Sector: Three Provincial Case Studies, by M.J. Prince and G.B. Doern; 143 pages, 9 tables, 2 illustrations. Published 1985.

No. 34 Mining and the Macdonald Commission: The State of the Industry in the Mid-1980s, by D. Yudelman; 116 pages, 2 tables. Published 1985.

No. 35 Effects of Location on the Competitive Position of Mineral Exploration and Development Opportunities in Canada, by B.W. Mackenzie, D.W. Dallas and M.L. Bilodeau; 84 pages, 17 tables, 14 illustrations. Published 1986.

No. 36 Mine Infrastructure and Economic Development in North Australia, by C. O'Faircheallaigh; 104 pages, 7 tables, 5 maps. Published 1986.

No. 37 Intergovernmental Mineral Commodity Arrangements, by W. Keith Buck; 80 pages. Published 1986.

No. 38 Value-Added Taxation: Issues and Impact for Canadian Mines, by B.J. Dyack; 70 pages. Published 1986.

#### Technical Papers

No. 1 Financing and Stabilization Policies in a Cyclical Industry: The Case of Inco in the Seventies, by W.T. Cannon; 200 pages, 33 tables, 12 illustrations. Published 1981.

No. 2 Economic Effects of Smelter Controls on the Canadian Nonferrous Mining Industry, by B.W. Mackenzie and M.L. Bilodeau; 162 pages, 44 tables, 16 illustrations. Published 1982.

No. 3 Secondary Supply of Copper and Ferrous Metals and Canadian Metal Markets, by K. Stollery; 138 pages, 24 tables, 16 illustrations. Published 1983.

No. 4 Mineral Technology Transfer: Evaluation of the CANMET Pit Slope Project, by B.W. Mackenzie and R. Pakalnis; 220 pages, 20 tables, 17 illustrations. Published 1985.

No. 5 Sourcebook for Native Participation in Canadian Mineral Activities, by M.J. Wojciechowski and K.A. Graham; 160 pages, 2 tables, 1 illustration. Published 1985.

No. 6 Geological Aspects of Mining Productivity: Canada's Base Metal Resources, by B.W. Mackenzie; 115 pages, 19 tables, 11 illustrations. Published 1985.

#### Mineral Policy Updates

Mineral Policy Update 1981, by Margot J. Wojciechowski and C.E. McMurray; 85 pages. Published 1983.

Mineral Policy Update 1982, by Margot J. Wojciechowski and C.E. McMurray; 88 pages. Published 1983.

Mineral Policy Update 1983, by Margot J. Wojciechowski; 88 pages. Published 1984.

Mineral Policy Update 1984, by Margot J. Wojciechowski and M.L. McAllister; 117 pages. Published 1985.

**Eastern Arctic Study**

(Published jointly by the Centre for Resource Studies and the Institute of Local Government)

The Inuit Land Claim, Constitutional Development, and Local Government Reform in the Northwest Territories: An Overview, by Katherine A. Graham and Anne B. McAllister, 50 pages, published 1981.

Industrial Development in the Eastern Arctic Study Area: A Preliminary Overview, by C. George Müller, 31 pages, published 1981.

Eastern Arctic Study Case Study Series: The Alaska Native Claims Settlement, by David Baker, 100 pages, published 1982.

Eastern Arctic Study Case Study Series: Mineral Exploration in the Baker Lake Area, by Anne B. McAllister, 58 pages, published 1982.

Eastern Arctic Study Case Study Series: The Development of the Polaris Mine, by Katherine A. Graham, 61 pages, published 1982.

Eastern Arctic Study Case Study Series: The Nanisivik Mine, by Margot J. Wojciechowski, 62 pages, published 1982.

Eastern Arctic Study Annotated Bibliography, by M.P. Sharon Brown, 68 pages, published 1984.

A Climate for Change: Alternatives for the Central and Eastern Arctic, by Katherine A. Graham, M.P. Sharon Brown, Anne B. McAllister, and Margot J. Wojciechowski, Final Report of the Eastern Arctic Study, 198 pages, published 1984.

Eastern Arctic Study Case Study Series: James Bay Settlement, by Anne B. McAllister, 61 pages, published 1985.

Eastern Arctic Study Case Study Series: Beaufort Sea Oil and Gas Development, by M.P. Sharon Brown, Katherine A. Graham and Margot J. Wojciechowski, 85 pages, published 1985.

